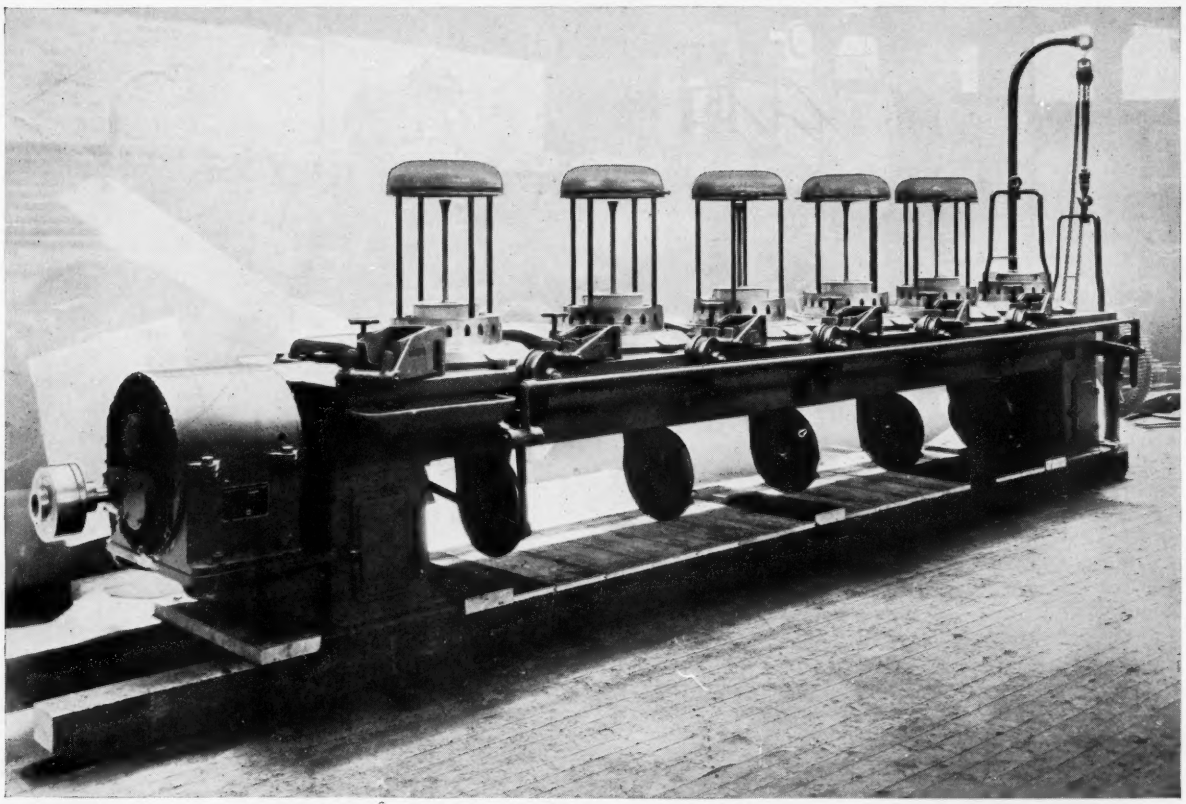
WIRE & WIRE PRODUCTS

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION



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December 1931

Sleeper & Hartley TRADE MARK
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SINGLE HOLE
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WIRE DRAWING EQUIPMENT

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WORCESTER, MASS., U. S. A.
DESIGNERS & BUILDERS OF PRODUCTION WIRE MILL MACHINERY

Notice of Suit For Infringement of Patent

TO ALL WIRE DRAWERS

On Nov. 24th, 1931 papers were served on the Union Wire Die Corp., and Morris Simons individually, both of New York City, for infringement of the following patents:

1,582,434---Apparatus for drawing wire---April 27, 1926

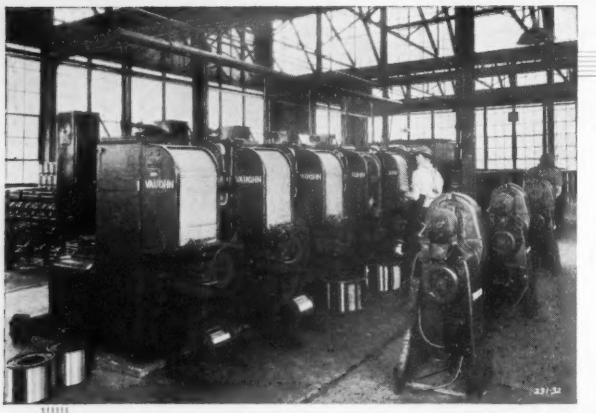
The suit is brought in the United States District Court Southern District of New York.

An injunction is sought restraining the acts of infringement, as well as an accounting of profits and damages arising out of past infringements.

MASTER

WIRE DIE CORPORATION

408 Concord Ave., New York



No. 2 Copper Wire Drawing Machines {Patented}.

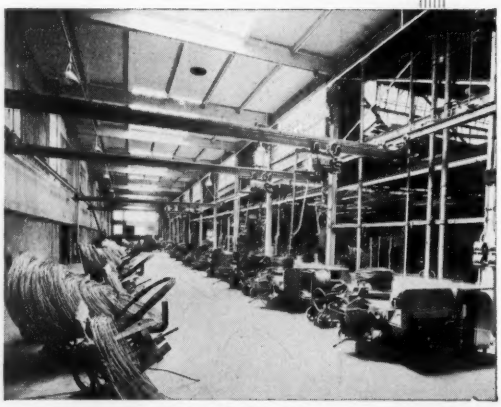
VAUGHN
WIRE DRAWING EQUIPMENT

BATTERIES of these modern machines are setting enviable production records in many leading wire mills. Compactness —higher speeds—smoothness—safety—interchangeability of parts —individual drives—automatic controls—are a few of the high spots of Vaughn design—features which help to make Vaughn Wire Drawing Equipment different and superior.

Descriptive literature on Vaughn Motoblocs or Vaughn Copper Wire Drawing Machines sent upon request.

THE VAUGHN MACHINERY COMPANY
CUYAHOGA FALLS, OHIO

Double Deck Motoblocs drawing steel wire {Patented}.



VAUGHN equipment includes Motoblocs for drawing steel and stainless steel wire, high speed copper wire drawing machines, and other wire mill equipment for Pointing, Cleaning, Baking, Heat-treating, Galvanizing, Tinning, etc.

WIRE & WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip. Wire Products and Insulated Wire and Cable.

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING.

Vol. 6 December 1931 No. 12

Official Publication of The Wire Association

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CHARLES F. KENWORTHY, Incorporated WATERBURY, CONNECTICUT

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A monthly publication devoted to the production of Wire, Rod and Strip.
Wire Products and Insulated Wire and Cable.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 6 DECEMBER, 1931 No. 12

History of the Wire Industry

By Kenneth B. Lewis

Wire Mill Engineer, Morgan Construction Co., Worcester, Mass.

A description of the Development of Wire Drawing and Its Processes Presented Before the 1931 Meeting of the Wire Association. ▲ ▲ ▲ ▲ ▲ ▲

EVEN though you may have forgotten all the rest of your geometry, you will doubtless remember that it takes three points to determine the position of a line. In a similar way it takes three points to determine the position of a mechanical craft; the past, the present, and the future. The future is out of our range of vision, but if we get far enough into the past, we can sight over two points and lay a fairly accurate course into the future. What I am trying to say, in a new way, is that the only sound basis on which to judge the future is the past. Unless all signs fail, and all industrial progress has been and must continue to be a haphazard affair, I need make no further apology for my interest in the history of wire drawing, nor for discussing it seriously before a gathering of busy men.

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THE recorded history of wire drawing is so scanty and the chances for digression and argument are so many, that in a brief talk of this sort I can do nothing but touch the high spots.

It is generally conceded by the few people who have dug into the history of our craft that pre-Christian wire was not drawn through dies. Such wire as has survived has been carefully examined and shows some traces of the manufacturing process. Some of it was sheared from plates and rounded by tapping with a hammer. Some was sheared from thin sheets and twisted; some was made by rolling up a scroll of thin sheet, pointing it down and pulling it through tapering holes in order to roll the scroll tight. In no case is there evidence of elongation by cold work, nor does such wire appear in lengths exceeding a few inches. When long wires were required, short pieces were brazed or soldered together. I have examined many specimens of wire from Rome, Greek and Egyptian tombs, without finding any ground for suspecting that a die was used in its preparation. Such wire was made of gold or silver and was purely an article of decoration with practically no commercial use. The records of trade and commerce of the Roman Empire have been searched and have yielded no reference to wire as an article of commerce.

KENNETH B. LEWIS
Wire Mill Engineer,
Morgan Construct on Company
Member Wire Association

✦ ✦ ✦

THE earliest known reference to the wire drawing die in literature is in a latin manuscript written about the year 1000 A. D. in a German Monastery. The writer, Theophilus, mentions dies as a part of the equipment of the usual metal working shop and describes them as being two or three fingers wide, rather thin and pierced with two or three rows of tapering holes. Since there is no description of a wire drawing process we can assume that it was a process well-known among metal workers. Dies have been found in deposits of tools and weapons dat-

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ing to the time of the Vikings in Norway, apparently of about the years 700 to 800 A. D., and these dies are exactly as described in the manuscript referred to. A rough, crude die, made of an irregular lump of iron, has been found in France and is believed by some people to date back to the third century. It is certainly cruder than the dies found among the Viking tools or described in the manuscript of Theophilus, and since it is generally conceded that the arts were more highly developed in France than further north, there is some justification for the feeling that the crudeness of this die is the crudeness of great age. There is the evidence. You can take it or leave it. Personally I am from Missouri. I find various bits of evidence in the Theophilus manuscript that lead me to believe that in the year 1000 the die was a rather recent invention.

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Figure 1. Wire Drawing Machine About Year 1200.

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AT any rate the drawing of wire through the die was well established about the year 1000 and within the next 400 years we find pictures of wire drawing machines, as shown in Fig. 1. The die, a perfect model of the English wire drawing plate of today, has three rows of holes and a handle. The handle is sunk into a sort of chopping block. The wire drawer sits in a swinging seat and has a pair of tongs linked to his belt. He swings forward, grips the point, puts his feet up on the die and pushes himself away from it, getting about a foot of wire. This is repeated as long as the rod lasts. The same process is done over and over with frequent annealings until the wire is small enough to go onto a spool which can be turned by hand. This particular picture dates about 1350 but this identical process was in use in Sweden and Russia in 1750.

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A LITTLE later we find a refinement, indicated in Fig. 2. The die is fixed on a sloping bed at the end of which is pivoted a bell crank, one end being a handle on which the wire drawer can throw his weight and the other end carrying linkage and tongs which the man opens and closes by hand at each stroke.

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AS a matter of fact, both of these wire drawing schemes were obsolete at the time the pictures were made. A certain German, Rudolph of Nuremberg, made an invention in 1350 and went in for wire drawing in a big way. His process was absolutely secret and the records of that time show that he made a great fortune. His competitors got hold of Rudolph's son and succeeded in bribing him so that he described to them the process which, as described in the Latin records of the town of Nuremberg was—"The drawing of wire by the labor of wheels." And the son described how the tongs were actuated by cams on the shaft of a water wheel. To illustrate how slowly progress was made in the early days of the industry, bear in mind this description of Rudolph's invention, at the same time looking at Fig. 3 and reading a translation from the Latin of Eobanus Hessus. Rudolph's invention was in 1350. Hessus wrote in 1500 and the illustration before you was published in 1760 and represented the last word in wire drawing at that time. The description runs as follows: "One can see how the work is done by the weight of the wheels and with what great power they stretch the iron and how they perform what 1000 men could not do before this art was discovered. A great wheel driven by the force of water, drives with itself a powerful shaft whose surface is armed with many teeth and when this shaft is turned by the water power, these teeth push and drag with them the parts of the machine which, although they resist, are unable to withstand the terrific force of the shaft, the wheel and the water. The dragons (tongs) seize with their sharp teeth the raw iron, and smooth it to round

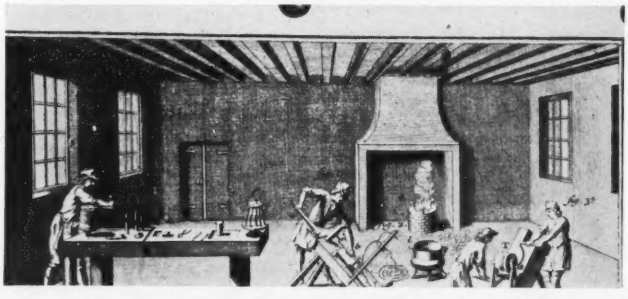

Figure 2. Wire Drawing Machine About Year 1750.

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wire which is taken out of the dragon's mouth and coiled into a thousand convolutions." This picture as I say, was published in 1760 and shows the highest state of the art at that time. It corresponds exactly to the description by Hessus in 1500 and is the process described by Rudolph's son in 1350. Four hundred years has worked no change in wire mill equipment.

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THE years 1400 to 1500 were marked by one of the early industrial revolutions, the harnessing of water power to industry. The state of the art in Italy in 1540 in shown in an illustration (Fig. 4) from the book by Birringuccio. The shaft of his water wheel is a crank shaft and tongs are linked to the crank by a rope and belt. The operator sits in a swinging seat and rides back and forth with the tongs, closing and releasing them.

Coating and Lubrication

THE matter of coating and lubrication is of great interest. Very little is said about these functions in early accounts and there is ground for belief that they played little or no part in the process. Birringuccio refers to wax as a coating but seems to believe that it is used only to preserve a bright color on gold and brass wire. In the many illustrations of the fifteenth, sixteenth and seventeenth centuries, no lubricant is shown except that occasionally one can see a little bag of cloth or leather apparently threaded onto the wire and lying against the die. This doubtless held some kind of grease. In 1750 one writer mentions that a greasy rag is placed near the die. We must of course bear in mind that coarse wire was in very short pieces, had extremely light drafts and was annealed after two or three reductions. It was also deeply scored every two or three inches with grip marks, and a few scratches would be of little consequence. We must remember too, that coarse wire had no commercial value except as a raw material for fine wire. Still it seems safe to conclude that the various commentators and artists through whom we have our contact with the industry, overlooked this point and that there was some use of a lubricant.

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Discovery of Sull Coat

AS for a coating, we know pretty definitely that up to 1650 there was none. The rods, about ½" diameter and 6 long, were freed from scale by hand scouring with stone and sand. Annealed wire was cleaned in the same way and went direct to the die in this condition. In 1650 a startling discovery was made and later recorded. It seems that while iron wire was being successfully drawn to fine gauges and was being extensively used for wool cards, fish hooks and similar purposes, high carbon steel could not be reduced through the die. This was not from any lack of appreciation of what steel wire would be worth, for many attempts had been made to draw it. A wire drawer in Altena, disgusted after one of his unsuccessful efforts to draw steel, threw his steel out the window and it landed behind the privy. A few days later he picked it up and tried it again. It had been lying in a damp spot and it had taken on a brownish surface deposit, in other words, a sull coat. This he did not polish off and to his great surprise the steel went very nicely through the die. This was a big day for Altena. The art of drawing high carbon steel had been discovered.

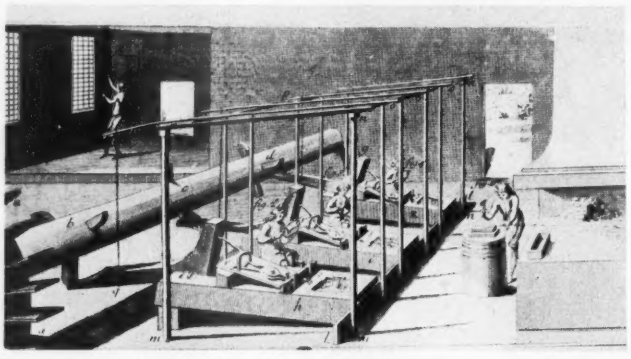

Figure 3. The Last Word In Wire Drawing in 1760.

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FOR 100 years this secret was kept in the Altena district and all steel wire was coated in exactly the same way as the first sample. A writer of that time speaks of the wives and children of the wire drawers going to the mills at noon carrying yokes over their shoulders, from one end of which hung buckets of lunch and from the other buckets containing the family contribution to the art of sull coating. About 1750, after 100 years of experiment, it was found that dilute sour beer would produce a sull coat. After another hundred years, it was discovered that water would do it.

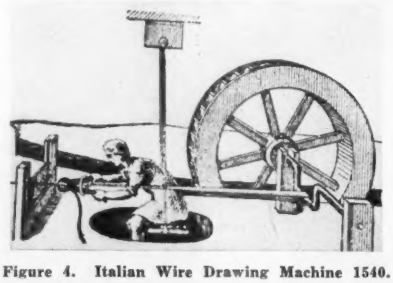

Figure 4. Italian Wire Drawing Machine 1540.

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NO other coating than the sull coat is mentioned in the records except for a suggestion by Rinmann in 1750 that the wire will draw better if soaked in lime water. I can find no further reference to lime, not even in a treatise written in 1830 which described the wire drawing process rather completely. In 1860, wire was being lime coated and baked in some parts of England. American mills were struggling with the lime coating during the 1880's and 1890's. It is my understanding that the general use of the lime coat was preceded by the flour coat which some of you may remember. The flour coat was just going out when I first came into the wire mills twenty-five years ago. If any of you have any information on this point, I hope you will get it on record before it is entirely forgotten. My guess is that the flour coat ran possibly from 1850 to 1890 and was overlapped by the lime coat which struggled in sometime between 1860 and 1880.

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Nature of Lime Coat

THIS history of coatings possibly throws some light on the nature of the lime coat and its reason for existence. I was told in my early days that the lime coat was used to neutralize acid. As a matter of fact, it is about the poorest neutralizer for sulphuric acid that could be imagined. Furthermore, it was used at a time when no sulphuric or other mineral acid was available so it could not have been taken up originally as a neutralizer. Of course it has no lubricating value of its own. It has

always been my idea that lime acts as a carrier for lubricants which are too soft to stand the enormous pressures in the bearing of the die. Just as a light oil is sometimes absorbed in a heavier oil to do a job which neither could do alone, so is lime used because it entraps in its rough, loose structure, the relatively soft grease or soap and holds it against the tendency to squirt back as it feels the pressure in the conical bearing. The sull coat probably acts in the same way. It bonds to the steel better than lime. The sull coat and the lime coat together probably make a thicker coating and carry in more lubricant than either could carry alone.

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Cleaning

I HAVE spoken of cleaning as a mechanical operation. It was purely mechanical up to sixty or seventy years ago. At first the bars were scrubbed with stone and wet sand. Later, beginning about 1730, mechanical thrashing came in, the power being supplied through water wheels. The tumbling barrel was in use as late as 1860 and was of course effective so long as bundles were small and there was little danger of tangling. The organic acids were used to a small extent as early as 1750. Rinmann at that time reports that pyroligneous acid would remove scale but only after an immersion of from one to two months. In 1800 a light scale on annealed wire was removed by boiling the wire in tartar and the very fine scale resulting from annealing in sealed pots was pickled off in sour beer. These organic acids are not so bad. I found twenty-five years ago that a soaking of two or three days in rye meal liquor would soften up a fairly heavy annealing scale so that it would peel out of the die without doing any damage. I cannot find any reference to the first use of mineral acids. Doubtless sulphuric acid was the first. It seems to have been used in a small way in preparing sheets for tinning as early as 1805 but there is no reference to its use in later descriptions of the wire making process. It seems reasonable to conclude that three factors operated to bring sulphuric acid into the wire mills First, there must have been a demand for coarse wire as a finished product, free from the scratches which were tolerated in a semi-finished product and in longer pieces than had been previously worked. Second, there must have been a source of supply of rods in bundles too heavy for convenient handling in the tumbling barrel. Finally, there must have been a supply of cheap acid available. These three factors probably came into play between 1845 and 1860. The electric telegraph started a demand for long, coarse wires with as few splices as possible and of a decently uniform section. Rod mills in 1845 had worked up to 17 pound bundles and were rolling rods ranging from ¼″ to 9/32″. In fact, one mill was doing 5½ gauge. Finally, the great mines of Nevada were beginning in the 1850's to ship sulphide ores to the East and to Europe for refining and it can be supposed that sulphuric acid as a by-product began to look around for a market.

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Annealing

ANNEALING has never made much progress. Open fire annealing was of course the earliest practice but the use of pots came in rather early, especially for fine wires.

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Drafting Pratice

DRAFTING practice is naturally a subject on which early records are very obscure. There were apparently no gauges. Since there were no automatic machines requiring accurately drawn wire, wire was ordered by name rather than by size. I am referring of course to fine wire since coarse wire was only a semi-product. The coarse wire had no size. It was so distorted by grip marks that scratches were probably never noticed. It is interesting to speculate on this non-use of coarse wire. Was there no field for it because it was of such a rough character or was it rough and scratched because there was no demand for it as a finished product?

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THERE are a few bits of evidence in the records regarding drafting practice. In 1750 wire reaching No. 8 gauge had had from 20 to 25 drafts and 3 annealings and the loss was already 25%. In 1800 wire at 20 gauge had had forty drafts and six annealings. In 1828 fine wire, size not specified, had had 35 to 40 drafts and 4 to 5 annealings. It is easy to deduce that not only were the dies improving, but the raw material.

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Dies

DIES are not discussed in the early records. Doubtless everything pertaining to dies was a deep secret. About 100 years ago, we find the first description of the die making process. These were the composition dies with soft backs and hard faces, characteristic of European practice until quite recently, and in fact still to be found in large numbers. The hard material was prepared by breaking up thin cast iron pots and refining these fragments by repeated melting in a charcoal fire. After each melting, the pieces were again cracked up. After ten or twelve re-melts, we can imagine that the carbon had dropped to 2 or 2½ percent and that the silicon was pretty well gone. This material must have been on the border line between white cast iron and tool steel, with the carbon probably all in the combined form. At this stage a soft iron backing plate was prepared by deeply scoring one of its faces. The refined pot fragments were cracked up as small as possible and spread over this scored surface, being held in place by a wrapping of cheese-

(*Please turn to page 484*)

Copper Wire Production on Continuous Machines

By William D. Pierson

Secretary, Waterbury Farrel Foundry and Machine Co., Waterbury Conn.

A Method of Estimating Production Results to be Expected in Drawing Copper Wire and for Determining the Equipment Necessary for any Special Poundage Requirement. ▼▼

THE production of copper wire relative to the number and size of wire drawing machines is a problem which is continually faced by wire mill operators. To those of long experience knowing just what can be accomplished with the available equipment, suggestions from a machine builder may seem somewhat presumptuous, but the present discussion it is hoped will be helpful in considering a new plant or additional equipment to an existing mill. The modern tendency is towards high and still higher speeds, and, while this is not to be disparaged, it is far from the fact that doubling the speed will double the output.

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TO increase the output, in addition to increasing the drawing speed, many other conditions must be carefully considered, paramount of all being the reduction of lost time in handling, changing coils, spools, etc. A general summary might be reasonably listed as follows:

Modern equipment of machines capable of being run at high speeds with a minimum of repairs, horsepower consumption and floor space, also convenient and simple for the operator.

Maximum size of coil used at the start to reduce the number of string-up and other preparatory operations. It is modern practice to weld together a number of coils as delivered from the rolling mill, to give substantially a continuous length; also the use of modern composition dies—more especially for the larger sizes of wire—together with judicial use of diamond dies, renders possible the continuous drawing operation without exceeding the tolerance limits of diameter.

Weight of wire taken from the machine either in coil form from a block or on spools. Obviously, the greater the weight of the takeoff, the less frequently this operation is performed. Modern practice using electrical, air or water power means for removing heavy bundles or coils effects a considerable saving in time and, in addition, relieves the operator of the strain of lifting.

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EACH mill has its own problem to work out depending on local conditions and it is obviously impossible to make any recommendation for improvement which will apply to all cases. The accompanying chart and tabulation is the result of a careful study of modern practice, and presents a quick and simple means of determining the equipment necessary for any specific poundage requirement. The tabulated results show what may be reasonably expected on a basis of assumed values of size of wire, drawing speed, number of dies operated, weight of coils used at start and weights taken off, with a liberal allowance for lost time in handling.

How the Charts Work

IT is assumed, for convenience, that 4,000 lbs. of wire per hour is wanted, distributed over sizes No. 6 to No. 40 B&S. The pounds for each size noted on the chart are selected at random to equal a total of 4,000 lbs., and the results figure accordingly. It is quite simple to substitute any other quantities for the different sizes, thus deriving the pounds "process" to give the total amount required to be drawn on each size. Dividing these totals by the corresponding hourly productions of the machines used will determine how many hours run are necessary for the quantity wanted. In other words, suppose the result is 8 hours. If one machine is available it must run for 8 hours, if four machines are available each must run 2 hours.

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Values Entering into Calculations

FOR convenience, the various values entering into the calculations are itemized as A to M with the following explanation of each:

Item A—Finished size of wire wanted—B&S Gauge.

Item B—Starting size on wire drawing machine for finished size wanted.

Item C—Machine used for drawing and finishing the wire.

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Four Machines Are Indicated

1st—The rod machine of the tandem type to start at 5/16″ to ¼″ rod and built in 5 to 10 die constructions, preferably with change gear device to give different finishing speeds. In the present instance the suggeston is one 7 die machine for speeds up to 1600′ per minute and one 10 die machine with speeds up to 2000′ per minute. The two machines finish sizes No. 6 to 14 B&S inclusive. The stringing-up of the dies is performed on an outside machine.

2nd—No. 3—Twelve die machine Upright Cone Type to start at No. 8 to No. 10 and finish sizes No. 16 to No. 22 at speed of 2500′ per minute. This machine may be used either with an outside stringer or self contained device for threading up the larger size dies.

3rd—No. 2—Fourteen die machine, similar design, to start at No. 12 and finish No. 24 to No. 26 at a speed of 3000′ per minute. A self contained stringer is included for the larger size dies down to the point of hand pulling.

4th—No. 1—Sixteen die fine wire machine, similar design, except without string-up device, as all sizes within the capacity permit hand pulling. Machine to start No. 14 to No. 24 and finish No. 28 to No. 40 B&S at a speed of 3500′ per minute.

All the machines noted above are arranged for quick conversion to block or spool type and vice versa.

Operating Conditions To Be Considered

Item D—Drawing speed in feet per minute. These are average modern practice and in some instances run even higher.

Item E—Weight of coil used at the start. We have assumed a rolled rod weighing 240 lbs., as it divides evenly into the lesser weights noted in the take-off quantities—Item F.

Item F—Weight of bundles taken off. This plays a very important part in production and the greater the weight, the less frequently removals occur. This applies either to wire in coil form from a block or on spools.

Item G—100% Efficiency. This is the ideal condition giving the number of pounds per hour at the spcified speed without any stoppage whatsoever for stringing or removing the wire.

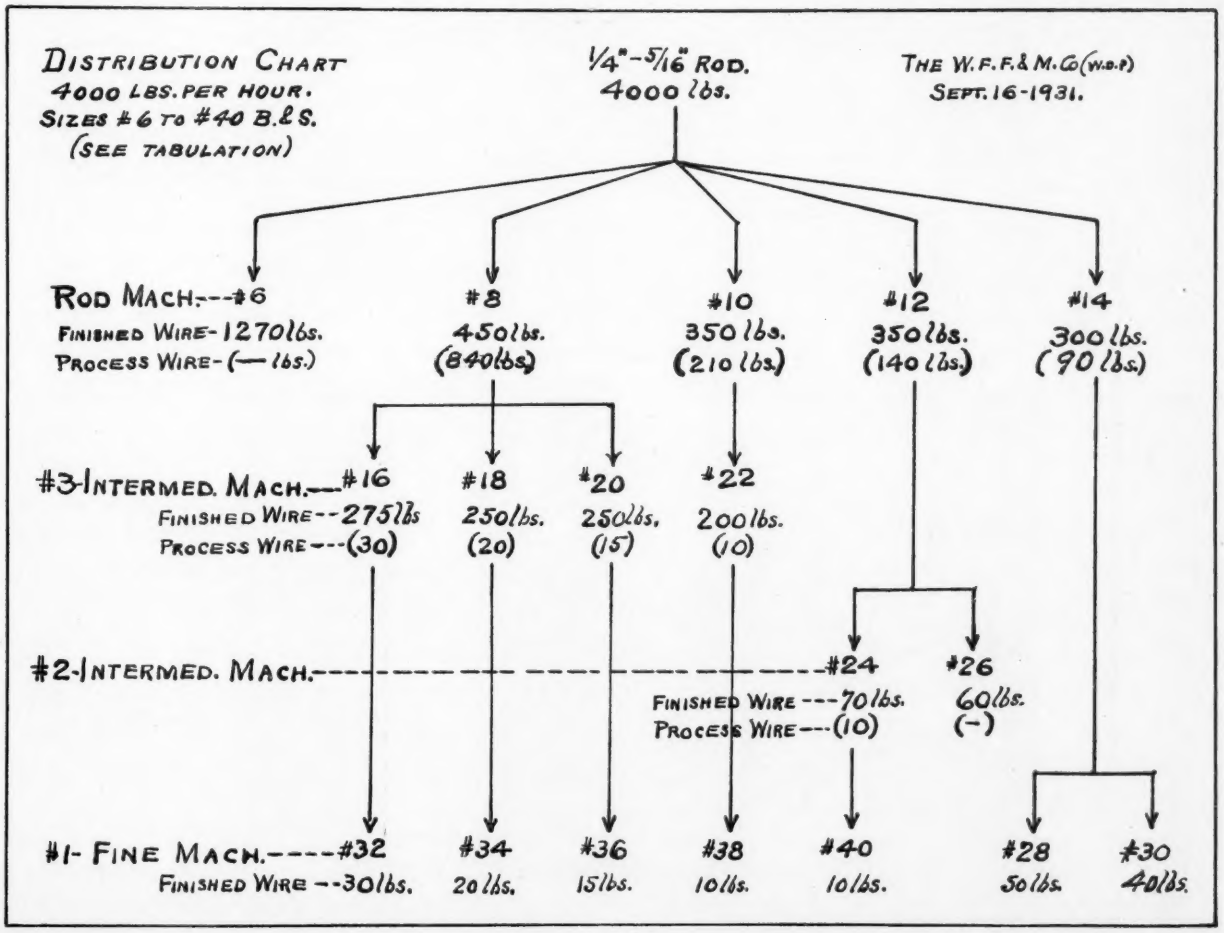
Item H—Estimated Hourly Productions. These figures are based on ample time allowance for stringing-up the dies, drawing the wire and removing the finished product—based on specified drawing speed—Item D, weight of coils used at start—Item E, and weights taken off—Item F. In many instances these figures are appreciably increased.

Item I—Efficiency of Drawing. This is obtained by dividing Item H by Item G and is a useful figure for checking.

Item J—Pounds wanted per hour for each size. These values are selected at random to bring a total of 4,000 lbs. per hour.

Item K—Pounds required for "process". These amounts are derived by including Items J of redrawn sizes as indicated on the chart.

Item L—Total pounds required per hour. These figures are the summation of Items J and K.



Item M—Hours required for total pounds, Item L. These figures are found by dividing each item L by the corresponding item H, giving the hours operation on one machine. It will be noted that finished sizes No. 6 to No. 14 total 2 hours—Sizes No. 16 to No. 22 total 3 hours—Sizes No. 24 to No. 26 total 1 hour—and Sizes No. 28 to No. 40 total 8 hours—approximately.

Equipment For Output Described

THE total equipment of Wire Drawing Machines for the 4,000 lbs. hourly output is as follows:

2—Tandems finishing No. 6 to No. 14.

3—No. 3 Up. Cone finishing No. 16 to No. 22.

1—No. 2 Pp. Cone finishing No. 24 to No. 26.

8—No. 1 Up. Cone finishing No. 28 to No. 40.

Number of Operations Required

IT will be seen from the chart that starting with the rolled rod:

To Finish No. 6 to No. 14—requires one operation.

To Finish No. 16 to No. 30—requires two operations.

To Finish No. 32 to No. 40—requires three operations.

✦ ✦ ✦

TO apply the **distribution chart** and the **production tabulation** to actual practice in determining the equipment of wire machinery necessary, the first consideration is the number of pounds wanted per hour of each size, Item J. In-

(*Please turn to page 489*)

PRODUCTION TABULATION (See Distribution Chart)
4000 lbs. per hr. - Finished Copper Wire #6 to #40 B&S

WFF&M Co (WDP)
9/16/31

A	B	C	D	E	F	G	H	I	J	K	L	M
B&S sizes Finished	Starting size on mach. for Finished size	Mach. used for Drawing	Drawing Speed Feet per min.	Weight of Coil at start -lbs.	Weight of Bundle taken off - lbs.	100% hourly Production -lbs.	Hourly Production of Mach.-Est.lbs.	Efficiency of Drawing - %	Wanted - Pounds per hour	Process - Pounds per hour	Total - Pounds per hr. required	Hours required for lbs. required
#6	5/16"	Rod	1250	240	240	6000	2700	45%	1270	---	1270	.47
#8	5/16"	"	1600	240	240	4800	2450	51%	450	840	1290	.53
#10	5/16"	"	1600	240	240	3000	1850	62%	350	210	560	.30
#12	5/16"	"	2000	240	240	2375	1600	67%	350	140	490	.31
#14	5/16"	"	2000	240	240	1490	1150	77%	300	90	390	.34
#16	#8	#3	2500	240	240	1170	635	54%	275	30	305	.48
#18	#8	"	2500	240	240	740	450	61%	250	20	270	.60
#20	#8	"	2500	240	60	465	295	64%	250	15	265	.90
#22	#10	"	2500	240	60	290	210	72%	200	10	210	1.00
#24	#12	#2	3000	240	60	220	170	77%	70	10	80	.47
#26	#12	"	3000	240	60	138	120	87%	60	--	60	.50
#28	#14	#1	3500	240	15	102	75	73%	50	--	50	.67
#30	#14	"	3500	240	15	64	52	81%	40	--	40	.77
#32	#16	"	3500	240	15	40	34	85%	30	--	30	.88
#34	#18	"	3500	240	15	25	22	88%	20	--	20	.91
#36	#20	"	3500	60	5	16	11	69%	15	--	15	1.36
#38	#22	"	3500	60	5	10	7½	75%	10	--	10	1.33
#40	#24	"	3500	60	5	6.2	5	80%	10	--	10	2.00

Testing Machine Effects Savings In Steel Rounds and Squares

Survey of change in testing methods at Laclede Steel Co., shows material annual savings. ▼ ▼ ▼

SAVINGS in excess of 100% over previous methods have been effected by the Madison, Illinois, plant of the LaClede Steel Company according to a certified performance survey made in this plant for Reihle Bros. Testing Machine Co. of Philadelphia.

This survey, made by A. C. Neilson Co. engineers in collaboration with O. F. Renner Superintendent of the LaClede Steel Company shows that 14,207 routine tests were made on a Riehle Screw Power Testing Machine of 200,000 lbs. capacity during 1930 at a cost of $.16 per test—saving them in excess of $8,400.00 annually.

✦ ✦ ✦

THIS company uses this machine in making both routine tensile tests as well as in research tests on reinforcing steel. Purchase of the machine has eliminated the inconvenience of having material tests conducted in outside laboratories and the time saved in testing has enabled them to speed up delivery of finished material.

THE machine is used in testing both round and square re-enforcing steel varying from ¼ inch to 1-¼ inch in size. Most of this company's steel is sold under rigid specifications and finished lots usually undergo a test witnessed either by the buyer's inspector or by a representative of a commercial laboratory. Standard specifications call for one test per lot of 10,000 lbs. of steel or less.

Although some orders do not require tests, the company nevertheless tests all lots before shipment and places all test results on file for reference. By so doing the physical characteristics of every lot of steel shipped from this plant are readily available and protects the company in case of disputes which might arise after receipt of shipments by the buyer.

Before the Riehle machine was purchased, all test work was handled outside the plant with the result that a minimum number of tests were conducted due to the inconvenience and expense involved, and what testing was done was solely of a routine nature. Little or no research work was done.

✦ ✦ ✦

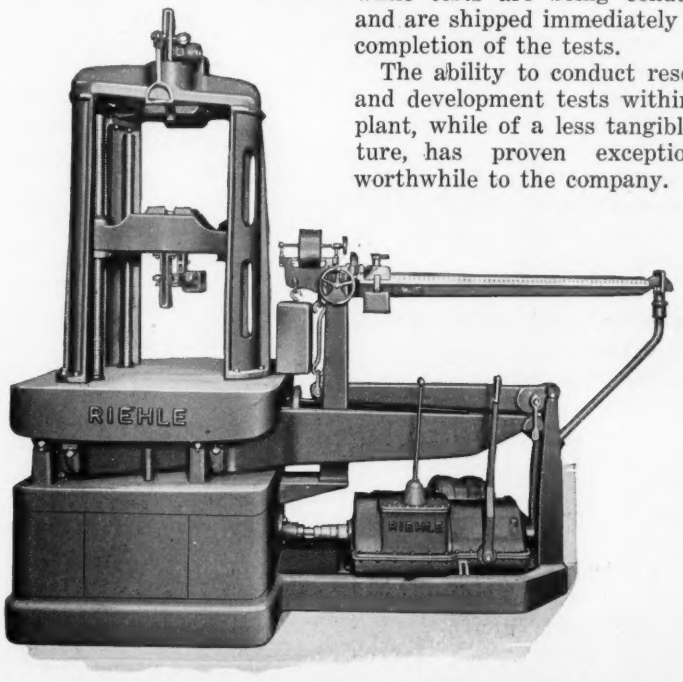
DURING 1930 fourteen thousand two hundred and seven tests were conducted during 275 working days of seven hours each. Of these tests approximately 10,000 were required by contract and the remainder were of a research nature in welded joints, concrete bonds, development work, etc. At $1.00 per test the former cost per outside test, the annual expense without the machine would have been $10,000.00 for routine tests alone. The cost of the same 10,000 required tests on their own machine amounted to $1,600.00. The annual saving of $8,400.00 is sufficient to return the entire first cost of their testing facilities at the rate of 108% annually.

In addition to the direct financial saving, use of this machine has provided the company with other decided advantages. It has eliminated the need of taking buyers' representatives outside the plant in order to witness tests.

✦ ✦ ✦

DELIVERIES have been speeded up, and it is now possible for the company to secure test results almost instantly. Frequently, orders are loaded on trucks while tests are being conducted, and are shipped immediately upon completion of the tests.

The ability to conduct research and development tests within the plant, while of a less tangible nature, has proven exceptionally worthwhile to the company.



Riehle Testing Machine Used in Test. ✦ ✦ ✦ ✦ ✦ ✦ ✦

Wire Galvanizing Processes

Geoffrey K. Rylands,
Rylands Bros. Ltd., Warrington, Lancashire, England

The fourth paper of a discussion on
HOT GALVANIZING VS. ELECTRO GALVANIZING
between Mr. L. D. Whitehead of Whitehead, Hill & Co., Ltd.
and Mr. G. K. Rylands of Rylands Brothers, Ltd.

Mr. Rylands takes issue with Mr. L. D. Whitehead of Whitehead, Hill & Co., and criticises the data presented on the electro-galvanizing process in the previous paper.

\+ + +

At the conclusion of this series of articles Mr. W. H. Spowers, Jr., well-known consultant on galvanizing, will review the controversy.

I read with great interest Mr. Whitehead's reply to my article on "Wire Galvanising Processes." I can assure him that rivalry between us can and will be carried out in the most friendly spirit; we are both searching for the most perfect method of wire galvanising, and our only difference lies in the means of achievement. Mr. Whitehead is in no sense a "new broom," and anyone who has had the privilege of inspecting his rolling mills will testify to their wonderful efficiency, admirable layout, and organization. Mr. Whitehead now, however, advances on the wire trade as a new prophet of electro-galvanising.

He can hardly claim that it is new process, for the number of patents in connection with it run into hundreds and date back a very large number of years. It is true that he may have devised new methods of carrying it out; but it is also true that during the past three years new methods of hot-galvanising have been adopted. So far as the leading firms in the wire trade are concerned, they are operating galvanising processes as new as Mr. Whitehead's. Mr. Whitehead's analogy, therefore, of the opposition of horse-owners to railways and motor cars does not hold good in this case. I am sure that no one would desire to oppose him or his process, for if it is as good as he believes, no amount of opposition could damage it. It would go forward by leaps and bounds, and every advanced wire firm in this country would be clamouring at his doors for licenses to operate it. I hope that I should get there first.

Mutual Goodwill and Search For Truth

MR. Whitehead may, therefore, rest assured that the criticisms which I have made or shall make are in no way dictated by blind opposition, but merely by a desire to arrive at the truth and ascertain whether everything which he claims for his wire is justified, and also whether the arguments which he puts forward in his last article are sound.

Mr. Whitehead suggests that the tests reported in my previous article were valueless, since I had not ordered his wire to a definite specification. I do not agree with him. Far more wire is sold subject to no specification than to one. The efficiency of one's production depends on the general quality of one's output and not on superlative results which may be obtained when working to an exacting specification. I wished to compare the general run of Mr. Whitehead's product with the general run of our own. The sample coils which I tested were clearly prepared for sale by Mr. Whitehead, for he did, in fact, sell them to me. I compared them with similar samples selected at random from our general fencing stock.

No comparison could be fairer. However, in order to remove Mr. Whitehead's objection, I ordered five coils of his 8-gauge wire and specified they were to resist the standard four one-minute dips in copper sulphate. After a long delay they were delivered, and on receipt I numbered them from one to five for convenience of reference. They were subjected to the same tests as reported in the previous article. The results were as follows, and for comparison I have shown alongside them the results of our Crapo wire in the same gauge as reported in my last article. The Crapo wire was not produced to any specification.

Coils Nos. 1, 2, 3, and 5 were of a dull grey and unpleasing colour typical of Mr. Whitehead's wire, and they were also covered with a fine powdery deposit. Coil No. 4 was of a sickly yellow tinge and looked quite different from the other coils.

Preece Test (in standard neutral solution of copper-sulphate). Specific gravity, 1.17 at 60° F. Three observations on each sample:—

Nos.	1.	2.	3.	4.	5.	Crapo
No. of dips.	2½	2	2	5	5	5½
	2	2	2	5	5	5½
	2½	2	2½	5	5	5½

Wrapping Test.—The wire was wrapped round its own diameter:—

1.	2.	3.	4.	5.	Crapo
Good.	Good.	Good.	Cracked badly.	Cracked badly.	Good

Dipping Test after Wrapping and Unwrapping.—The wire was wrapped round its own diameter, unwrapped and then subjected to the Preece test in the standard solution:—

Nos.	1.	2.	3.	4.	5.	Crapo.
Dips	—	2	2	—	—	5½

Samples 1, 4, and 5 broke repeatedly in unwrapping.

Percentages of Coat—These were obtained by weighing a piece of wire as received, stripping it and reweighing, the difference in weight then being expressed as a percentage of the original weight.

Three determinations were made on each sample:—

No.	Percentage of Coat 1.	2.	3.	4.	5.	Crapo
	1.25	1.17	1.22	3.06	3.03	3.72
	1.59	1.22	1.38	3.06	3.10	3.54
	1.70	1.25	1.38	3.15	3.10	3.47

Stripping Test.—These were taken in both sulphuric and hydrochloric acids on precisely 10 grams of wire.

Sulphuric acid 10 per cent Solution at 60° F. No.	Time to Strip	Hydrochloric acid 7½ per cent Solution at 60° F. No.	Time to Strip
1.	180 seconds	1.	100 seconds
2.	140 "	2.	130 "
3.	200 "	3.	150 "
4.	226 "	4.	150 "
5.	200 "	5.	130 "
Crapo	450 "	Crapo	450 "

Uniformity of Coat.—With a view to ascertaining the uniformity of the coat on the electro-galvanised wire the five coils were divided into five parts and tallied from A to E. Coat determinations by weighing were made at each end of each of the five pieces. The results were as follows:—

	A.		B.		C.	
	%	%	%	%	%	%
1.	1.24	1.24	2.70	2.66	1.14	1.28
2.	1.15	1.16	1.07	1.10	2.20	2.26
3.	0.82	0.78	1.81	1.85	2.92	2.96
4.	3.50	3.36	3.42	3.50	3.52	3.43
5.	2.00	1.96	3.11	3.02	3.36	3.28

✦ ✦ ✦

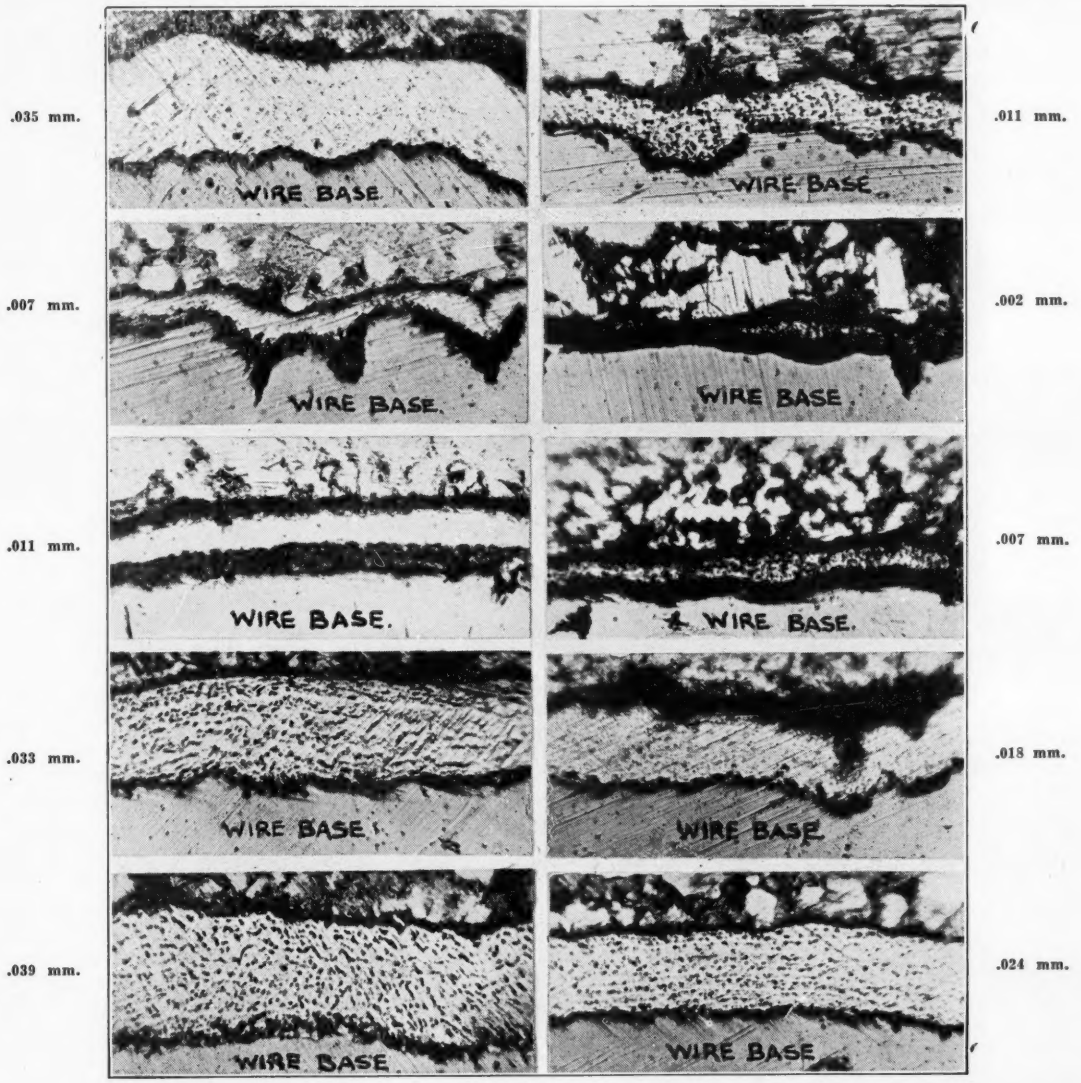
	D.		E.	
	%	%	%	%
1.	2.56	2.62	1.30	1.28
2.	2.15	2.96	2.90	3.00
3.	3.26	3.21	3.20	3.00
4.	3.40	3.26	3.20	3.12
5.	3.30	3.21	1.61	1.90

As a comparison the coil of 8-gauge Crapo wire was treated in the same way, and the results were as follows:—

A.		B.		C.	
%	%	%	%	%	%
3.75	3.68	3.65	3.60	3.72	3.60

D.		E.	
%	%	%	%
3.56	3.50	3.80	3.62

It will be observed that in No. 3 coil there is a maximum variation in weight of coat from 0.78



Maximum Coat Thicknesses. **Minimum Coat Thicknesses.**

Fig. 1.—Cross-Sections of Five Electro-galvanised Wire Coats. Polished Only. X 460.

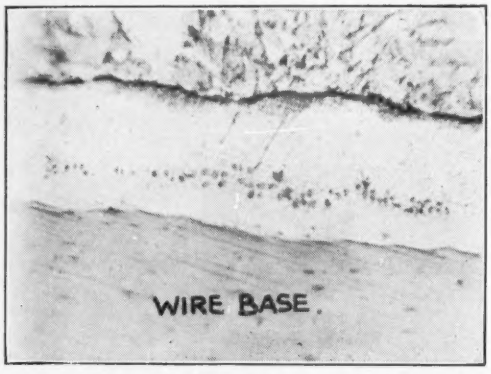
per cent to 3.26 per cent, and over the whole five coils the variation is from 0.78 per cent to 3.52 per cent. In the case of the Crapo wire the variation is only from 3.50 per cent to 3.80 per cent.

brought into accurate and sharp focus.

✦ ✦ ✦

I shall now proceed to meet the principal criticisms contained in

case of the electro-galvanised wire, it will be seen that minute cracks have developed in the coat into which the mounting alloy has penetrated, but in the Crapo wire the coat is still perfect and even at



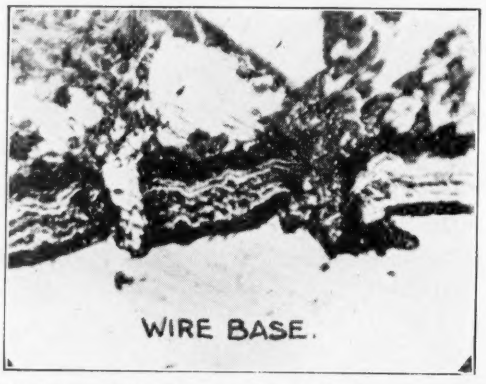


Fig. 1. Crapo and Electro-Galvanized Wires After Wrapping and Un-Wrapping. Electro-Galvanized Coat Cracks at Points Coincident with Surface Faults. Longitudinal Sections, Polished and Un-Etched. x 400.

Micro-Examination of Samples

FIG. 1 shows cross-sectional photo-micrographs of each of the five samples. There are two photographs of each sample taken at the points of maximum and minimum coat thickness. The thickness of the coat in millimetres is entered against each photograph. The magnification used was 460 diameters and the specimens were plain polished and un-etched. The laminated character of the coat is well illustrated in photographs of 4 and 5 samples. The mass of inclusions in the coat should be particularly noted.

All photographs show in greater or lesser degree the massive layer of non-metallic substance between the coat and the base, and also on the outside of the coat. The presence of this inclusion cannot be explained away by defective etching, for the samples were not etched, nor can imperfect focus or defective illumination be called in to account for it, since each sample was subjected to a very minute visual examination at all magnifications from 100 to 1,800 diameters with different types of illumination, and with the focus being varied constantly with the fine adjustment, so that all portions of the specimen were successively

Mr. Whitehead's last article. In regard to the question of a Central Electricity Board Specification, this point has been cleared in correspondence with The Ironmonger, and I need not refer to to the question further, except to say that I never implied in my article of May 3 that under the Central Electricity Board Specification the wire was wrapped round its own diameter.

I note that Mr. Whitehead challenges the accuracy of the tests on Crapo wire under the combined wrapping, unwrapping, and Preece test. He suggests that official tests should be made. I do not quite know what he means by this, but if he likes to bring his retinue of "experts" and some coils of his very best wire to Warrington, we could no doubt have the comparative tests made in the presence of an inspector appointed by one of the principal firms of consulting engineers.

✦ ✦ ✦

PHOTO-micrograph fig. 2, however, explains why the electro-galvanised wire gives imperfect results under this test compared to Crapo wire. The samples before being photographed were wrapped round their own diameter and then unwrapped, and in this case longitudinal sections were taken. In the

this magnification no cracks are discernible. Hence there is no reason why the Crapo wire should not stand an equally good dipping test before and after wrapping as before this treatment.

✦ ✦ ✦

Micro-Examination and Photography

In his previous article Mr. Whitehead published a series of photo-micrographs taken at a magnification of 100 diameters. The sections were, however, polished obliquely, and no information was given as to the degree of the obliquity, but assuming the magnification to be correct, and judging by the coat thickness shown, it must have been very great indeed. It is of course quite useless to polish specimens for coat examination obliquely, for the very features one wishes to observe are thereby distorted. It is like taking a photograph of a church steeple with the camera tilted upwards. In addition, the specimens have been imperfectly etched, so that all essential features of structure are masked.

Mr. Whitehead draws particular attention to the "penetrating bond" with the base metal. This "penetrating bond" is merely the penetration of the coat into drawing

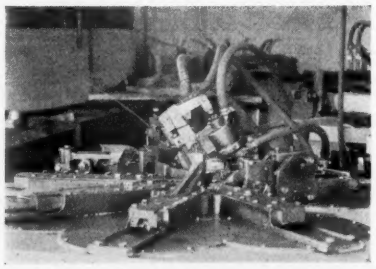
(*Please turn to page 486*)

Wedge Nut Lock Manufacturing

By Joseph C. Coyle

A Description of a Special Seven Slide Machine Developed for the Manufacture of Wedge Nut Locks, Together With an Outline of the Heat Treatment Used in the Process. ▼ ▼ ▼ ▼ ▼ ▼

HEAT treating is an important factor in the manufacture of the Wedge Nut Lock, a product of the Labbe Manufacturing Company Incorporated, of Denver. The nut lock is made in 12 standard sizes, from American spring steel annealed wire, drawn especially for the purpose. The locks are made slightly smaller than the bolts on which they are to be used, one end screwing tightly in between the threads at the rear of the nut.



The Machine. ✦ ✦ ✦ ✦ ✦

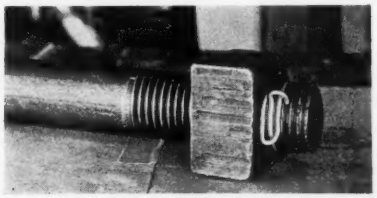
Special 7-Slide Machines Developed

SPECIAL seven slide machines had to be developed for the manufacture of the product, as there was no machine on the market for the purpose. Operated by electricity and compressed air, these machines make 1,600 nut locks per hour of the larger sizes, up to 1¾ inches, and 2,400 per hour of the smaller one, under 1 inch.

The machines are automatic. A roll of wire is placed on the feed spool and threaded into a series of vertical and horizontal straightening rollers, thence into a holding clamp, operated by air, on a sliding transfer which carries it forward into the center of the machine. An air operated holding finger grips the wire near the end, while knives, also air operated, cut the length of wire straight across the end, and at the same time form the wedge.

Operation of Machines

THE wire, projecting forward from the knives is gripped by a transfer finger on a second transfer parallel with the first. A small piston on this transfer, with sloping end, is forced under the rear of the holding finger by air from a small piston, causing the front of the finger to grip the wire. The knives release and the wire is carried against a spinner at the center of the machine, shaped to fit the work in hand. The spinner is operated by a geared horizontal cam, in forward and backward motion. It twirls the wire about a small post on slide finger No. 1. The finger releases, and slide finger No. 2 engages the wire. No. 3 finger moves in and upward, making the short ear of the nut lock and forming the wedge in a semi-circle.



The Product. ✦ ✦ ✦ ✦ ✦

✦ ✦ ✦

NO'S 6 and 7 fingers next advance, 7 forming the long ear on the wedge end of the nut lock and 6 bending the wedge. They release and No. 5 finger comes in and down, completing the nut lock.

(*Please turn to page 490*)

Fig. 1. Transfer Finger Starting Forward with Wire. ✦ ✦ ✦

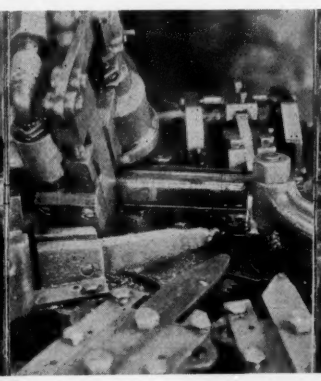


Fig. 2. Spinner Taking Wire From Transfer Finger Around Forming Pin. ✦ ✦ ✦ ✦

Fig. 3. Forming Fingers Producing Lock at Center. ✦ ✦ ✦

Fig. 4. Finger No. 5 Forming Wedge Off Ear in Position. ✦ ✦

Outstanding Personalities of the Wire Industry

Ralph K. Clifford has spent his entire working life in the wire and steel industries, with the exception of two years succeeding his graduation from the University of Michigan in 1914, where he specialized in metallurgical subjects and received the degree of Bachelor of Science. These two years were spent in the teaching of Physics and Chemistry in the High Schools of Michigan.

As a boy his summer vacations were employed in the nail and wire mills to enable him to continue his schooling.

He entered the employ of the Kokomo Steel and Wire Company as a chemist in 1916, serving successively as Chief Chemist, Metallulgist, Ass't Superintendent and Superintendent.

Upon the merging of this company into the Continental Steel Corporation in 1926 Mr. Clifford was made General Superintendent in charge of the Kokomo Works, including Steel plant, Wire Mills and Sheet Mills.

Frederick W. Willard, formerly assistant works manager of the Western Electric Co., Kearny, N. J., has been appointed executive vice-president of the Nassau Smelting & Refining Co., Tottenville, Staten Island, N. Y., which has been acquired by the Western Electric Co.

✦ ✦ ✦

John A. Moritz, general superintendent of the Crawfordsville, Ind., plant of the Mid-States Steel & Wire Co., has been named a member of the board of directors of the company.

✦ ✦ ✦

Ralph Leavenworth, heretofore assistant general sales manager of the Austin Co., Cleveland, has been appointed general advertising manager of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

✦ ✦ ✦

Forrest G. Harmon has been appointed manager of sales of the tubular goods department of the Columbia Steel Co., succeeding the late **George S. Garritt.** Mr. Harmon joined the National Tube Co. at Pittsburgh following his graduation from college and on June 1, 1926, was sent to San Francisco to enter the department which he he now heads. **T. W. Brooks**, former assistant manager of sales in the same department, has retired after 54 years of continuous service with the company. He joined the National Tube Co. at Pittsburgh in 1877. He is succeeded by **A. T. Cooper**, who has also served many years with the National Tube Co., both at Pittsburgh and at San Francisco.

✦ ✦ ✦

IT is of interest to wire men to know that at one time the late **Thomas A. Edison** was sufficiently interested in the wire industry to invent a machine for drawing, annealing and cleaning in a continuous process.

He had three patents issued covering this. Two dated September 23rd, 1890 numbers 456968 and 456969, filed June 10th, 1884, and one dated July 7th, 1890 which was filed October 21st, 1887.

Mr. C. B. S. Jackson of Blue Island, Illinois who has copies of these patent papers makes the comment that "the probability that Mr. Edison lived to a good old age was because he did not follow this up and become a wire man."

✦ ✦ ✦

W. L. Brown has bought out Mr. Bohne's interest with the Detroit Wire Die Company and is now the sole owner of the company.

✦ ✦ ✦

The Detroit Wire Die Company has established a plant at McKeesport, Pa., for the manufacturing and servicing of Tungsten Carbide dies in that territory. They still maintain their Detroit plant.

✦ ✦ ✦

J. N. Remsen, for many years with the Central Alloy Steel Corporation of Canton, and Massillon, Ohio, has joined the Eastern Rolling Mill Company in the capacity of assistant sales manager.

✦ ✦ ✦

AT the meeting of the Board of Directors of the Westinghouse Electric and Manufacturing Company held Wednesday afternoon, October 28, **W. L. Mellon** was elected a member of the Executive Committee to succeed the late Harrison Nesbit.

✦ ✦ ✦

THE National Electrical Manufacturers' Association appointed **H. D. Reed**, Bishop Wire and Cable Company, New York City, as its representative on the Standards Council of the American Standards Association, and **H. A. Calderwood**, Electrical Engineer, National Molding Division, Electrical Products Corporation, Pittsburgh, Pa. as alternate for Mr. Reed on the Council. Mr. Reed succeeds **R. W. E. Moore** of the National Electrical Manufacturers Association.

✦ ✦ ✦

Walter C. Stone, manager of the Grand Crossing plant, Chicago, of the Republic Steel Corpn., died Nov. 7 at the Mayo Hospital, Rochester, Minn., after a long illness. He was at one time assistant district manager at Cleveland for the American Steel & Wire Co. and later was transferred to Chicago in the same capacity.

A Review of Recent Wire Patents

No. 1,823,990, WIRE TAKE-OFF MECHANISM, Patented Sept. 22, 1931, by Arthur K. Sanderson, of Aurora, Illinois, Assignor to Love Brothers Incorporated, of Aurora, Illinois, a Corporation of Illinois.

The mechanism may be used with different types of wire making machines, wrapping wire machines, insulating wire machines, etc. A number of spools are carried by the mechanism arranged to be filled one at a time to allow the removal of the wound wire from one spool while another is being filled.

✦ ✦ ✦

No. 1,824,771, COATING COMPOSITION, Patented Sept. 29, 1931, by Edwin P. Cox, of Edgewood Arsenal, Maryland.

While particularly adapted for coating rubber, this coating composition may be employed for covering other material and will not allow light to penetrate, over the usual range of wave lengths, to the surface coated, nor will it check and crack. The composition comprises 75 to 100 parts of a smoked sheet rubber base, 25 to 63 parts of carbon black, 10 to 33.3 parts of paraffin, and from 0 to 2 parts of an antioxidant (such as "Agerite").

✦ ✦ ✦

No. 1,825,171, AUTOMATIC SCREW THREADING MACHINE, Patented Sept. 29, 1931, by Jean Francois Arnold, of Paris, France.

In this machine rotating chucks hold the screw blanks while a number of tools, corresponding in number to the chucks, cut the threads and point the screws as well as then release the screws from the chucks.

✦ ✦ ✦

No. 1,825,218, CABLE REEL STAND, Patented Sept. 29, 1931, by Charles F. Van Hook, of Paterson, New Jersey, Assignor to Watson Machine Company, of Paterson, New Jersey, a Corporation of New Jersey.

In the handling of large wire cables, the inventor does away with the use of a heavy shaft, with its gears, etc., and uses instead opposed horizontal spindles, which when the reel has been placed between them are entered into its bore so as to serve to lift the reel when they are elevated.

✦ ✦ ✦

No. 1,829,118, PROCESS FOR MAKING STEEL INSENSIBLE TO THE ACTION OF HOT GASES AND VAPORS, Patented October 27, 1931, by Benno Strauss, of Essen, Germany, Assignor to Fried. Krupp Aktiengesellschaft, of Essen-on-the-Ruhr, Germany.

The process of treating the steel, which contains about ½ to 4 per cent of nickel, ½ to 2 per cent of chromium, and 0.1 to 0.39 per cent of carbon, to render the same insensible to the action of hot gases and vapors, consists in refining the grains and the oxide particles lying between them by heating the steel above the point of recalescence, Ac3, quickly cooling it from above this point and reheating it up to about 600 degrees to 650 degrees C.

Complete Descriptions and Drawings of Patents May Be Had for 25 cents. Address, Wire & Wire Products, 551 Fifth Avenue, New York.

No. 1,826,012, SPRING STRUCTURE, Patented October 6, 1931, by Robert E. McElroy, of Jackson, Michigan, Assignor to Reynolds Spring Company, of Jackson, Michigan.

It is one object of the present invention to provide a clip constructed in order to obviate the present practice of kinking, bending or offsetting at intervals the upper frame wire or the usual wire which cooperates therewith for the provision of the usual overhang at the front and rear upper edges of spring seat structures, and to utilize this clip for the securing of the adjacent end of the diagonal stay wires to eliminate the employment of a separate clip.

✦ ✦ ✦

No. 1,826,060, METHOD OF MAKING HELICAL SPRINGS, Patented October 6, 1931, by George M. Eaton, of Pittsburg, Pennsylvania.

The method comprises twisting a steel rod or heavy wire to a predetermined angle about its own axis and coiling the twisted rod or wire, so that the streaks inherent in the steel are substantially at right angles to the direction in which torsion is imposed upon the rod or wire.

✦ ✦ ✦

No. 1,826,092, METHOD FOR MAKING FLEXIBLE INSULATED WIRE, Patented October 6, 1931, by Harold deBlois, of Bristol, Rhode Island, Assignor to National India Rubber Company, of Bristol, Rhode Island, a Corporation of Rhode Island.

This relates particularly to fixture wire, and the same comprises a core of wire, insulating material composed of latex paper spirally wrapped around the wire, and a covering of an in-situ deposit of the solids of an aqueous dispersion of rubber over the latex paper.

✦ ✦ ✦

No. 1,826,515, WIRE FENCE MAKING MACHINE, Patented October 6, 1931, by Miklos Haidekker, of Budapest, Hungary.

The machine is one for producing wire fencing consisting of straight or undulated stays and strands comprising a pair of wires twisted together. The operation of the machine is based on the principle of conducting the pairs of wires for the strands through a twister which will hold the same spaced relation to one another, these wires thereby forming a shed in front of the twisters. Particularly the invention lies in a new twister having a front and a rear head portion, each of which is provided with notched rollers for the smooth passageway of the strand wires and for holding such strand wires in spaced relation so as to form a front and rear shed.

✦ ✦ ✦

Reissue No. 18,219, WIRE TYING APPLIANCE, Reissued October 6, 1931, to John Sherman McChesney, of Chicago, Illinois, Assignor, by Mesne Assignments, to the Gerrard Company, Inc., of San Francisco, California, a Corporation of Delaware.

For using wire to band and tie about boxes, etc., the inventor provides a machine which uses the wire directly from a reel or coil, and which automatically compensates for variations in the periphery of the object packaged or tied, and which cuts off the wire when the tie is finished.

✦ ✦ ✦

No. 1,828,304, HINGED CONVEYOR BELT, Patented October 20, 1931, by Francis N. Woodman, of Clinton, Massachusetts, Assigner to Wickwire Spencer Steel Company, of New York, N. Y., a Corporation of Delaware.

This is a wire belt, formed of hinged sections, the mesh and openings at the hinged points being of about the same size. The belt is adapted for use particularly in conveying tobacco or similar products.

✦ ✦ ✦

No. 1,828,922, WIRE DRAWING CAPSTAN, Patented October 27, 1931, by William E. Carroll, of Worcester, Massachusetts, Assignor to Morgan Construction Company, of Worcester, Massachusetts, a Corporation of Massachusetts.

According to this invention, provision is made for air cooling the interior of the capstan portion of a wire drawing block or drum, and the discharge of cooling air from the capstan portion is so arranged that the ever-growing mass of wire accumulating above on the extension posts of the block, is maintained at a temperature low enough so that the wire will not be apt to suffer any detrimental effects, due to its long retention in mass or bunched formation on the block or drum.

✦ ✦ ✦

No. 1,829,209, INSULATION, Patented October 27, 1931, by Charles R. Boggs, of Waban, Massachusetts, Assignor to Simplex Wire & Cable Company, of Boston, Massachusetts, a Corporation of Massachusetts.

This is an insulated wire product comprising a wire conductor insulated with a continuous coating less than 0.016 inches in thickness of a rubber insulating compound, this latter being the coagulated deposition product of an aqueous dispersion including substantially uncoagulated vulcanized rubber.

✦ ✦ ✦

No. 1,829,498, WOVEN WIRE SCREEN AND METHOD OF MAKING THE SAME. Patented October 27, 1931, by John Boehm, of Cleveland, Ohio, Assignor to W. S. Tyler Company, of Cleveland, Ohio, a Corporation of Ohio.

The inventor aims to provide a screen of woven wire which shall maintain the size of opening originally formed and which will resist the tenancy to become "sleazy." Particularly, the invention covers a precrimped warp wire for use in combination with chute wires of woven wire screens, having heavy and light crimps therein, the light crimps facing oppositely and lying between the heavy crimps, and the latter facing oppositely and having their engaging faces spaced in a plane at right angles to that of the screen less than the thickness of the wire to be inter-woven therewith.

'Round the World With the Wire Industry

New Light Alloy Has Valuable Properties

A new light alloy with remarkable properties has been developed at the research laboratories of the Metropolitan-Vickers Electrical Co., Manchester. Though actually lighter than pure aluminum, this alloy is said to be as strong as cast-iron and yet so ductile that it can be rolled into thin sheets or drawn into rods for wire manufacture.

Unlike cast-iron or cast brass, it is not brittle; under sufficient stress it will bend, but up to considerable amounts of deformation it may be hammered or pressed back to shape without fracturing. When highly polished it takes the appearance of chromium plating, and like chromium plating it is highly resistant to tarnishing and corrosion, and will keep its polish for a long period.

The production of this alloy is the result of intensive research combined with practical experience. For over 30 years the company has devoted a large part of its plant to casting in aluminum and other non-ferrous metals. The new alloy is designated "M. V. C.," and consists of aluminum and silicon. Its remarkable properties depend on the special process of manufacture, which has been patented.

The electrical concern now uses this alloy exclusively for certain purposes in its own plant, and the success of the development is confirmed by the fact that the alloy has now received the approval of the British Admiralty and Air Ministry. In Admiralty specifications the alloy is specifically mentioned as an acceptable material for British naval service, in which strength and resistance to corrosion are most important considerations.

Following on these successful results the company is now extending its production to supply the alloy to users in other industries, primarily in the form of castings for customers' patterns, but also in the form of tubes and wire rods. On account of its lightness the alloy is cheaper than brass, while further savings are claimed to result from its low cost of machining and handling.

✦ ✦ ✦

World Marketing of Aluminum

A marketing company has been organized by the aluminum producers of Canada, Germany, France, England and Switzerland. It was also stated that some Norwegian producers had taken an interest in the company. The accord reached among the principal aluminum producers is similar to that among the platinum producers..

For the purpose of developing and extending the aluminum market the producers in these countries have set up a corporation capitalized at 35,000,000 Swiss francs, or about $7,000,000. It is understood that this central agency will engage in research activities calculated to develop a broader market for aluminum.

All future price quotations will be in Swiss francs.

✦ ✦ ✦

Japanese Galvanized Iron Wire

DURING the first half of the current year the production of galvanized iron wire in Western Japan reached between 44,000 and 45,000 coils monthly. The demand however, has decreased considerably and production has fallen off 30 per cent with a number of manufacturers suspending operations.

✦ ✦ ✦

International Platinum Accord Announced

A WORLD wide platinum accord was announced in London recently.

The accord, the announcement said, results from a new English company—Consolidated Platinums Ltd.—having concluded contracts to buy and resell virtually all the new platinum production originating in U. S. S. R., Canada, South Africa and Colombia, constituting the major portion of the world's output of this precious metal.

One of the new company's major functions will be to promote the use of platinum through an intensive research and market development program and to facilitate cooperation between distributors, producers and consumers in this effort.

The company will be managed by a committee consisting of representatives of the above companies with Mr. P. L. Ginsburg and Mr. E. B. Howard White as joint managers.

Sale of platinum which the newly-formed company will buy will be through existing distributors and dealers; thus, there will be no change in present distribution methods.

✦ ✦ ✦

British Complete World's Largest Steel Wire Rope

THE Whitecross Wire Company, of Warrington, England, has just completed the manufacture of what is claimed to be the largest steel wire rope in the world. This rope is no less than seven miles in length and 63½ tons in weight, and its cost is between £3,000 and £4,000 ($15,000 and $20,000 at par). It is intended for use on the new Glasgow Subway Railway. Special railroad trucks had to be obtained for the transport of the rope.

✦ ✦ ✦

American Manganese Steel Co. Enlarges Plant at Welland

The American Manganese Steel branch plant in Welland, Ont., Can., has awarded a contract to the Volta Manufacturing Company to reconstruct the furnaces at the local works to make possible greatly increased production of manganese steel for the Canadian trade. Production will be started as soon as the rebuilding is completed.

Exports and Imports of Wire

Exports of iron and steel wire products in August and September, 1931
(In gross tons)

	September 1931	August 1931	September 1930
Wire rods	2,675	2,167	1,288
Hoops, bands and strip steel	1,098	1,811	2,609
Plain black or galvanized iron or steel wire	835	1,417	1,474
Barbed wire and woven wire fencing	1,005	2,342	3,567
Woven wire screen cloth	55	74	122
Wire rope	211	144	453
Insulated iron or steel wire and cable	6	24	28
Other wire and manufactures	672	320	445
Wire nails	340	622	870
Tacks	37	40	27
Other nails including staples	234	221	377
Bolts, machine screws, nuts, rivets and washers	272	401	659
Total, these 12 classifications	7,440	9,583	11,919

Imports of iron and steel wire and wire products into the United States
(In gross tons)

Concrete reinforcement and other bars	8,374	7,443	6,269
Wire rods	593	333	400
Barbed wire	404	962	263
Round iron and steel wire	138	150	225
Telephone and telegraph wire		1	6
Flat wire and strip steel	74	50	100
Wire rope and strand	177	121	122
Other wire	21	31	51
Hoops and bands	2,857	1,946	2,916
Nails, tacks and staples	446	1,305	418
Bolts, nuts and rivets	57	37	33
Total, these 11 classifications	13,141	12,379	10,803

EXPORTS in September of iron and steel products were 3570 tons under the August figure. Imports rose by 827 tons.

Among the declines during September, barbed wire and woven wire fencing showed declines exceeding 1,000 tons. The trade with Japan included 2,123 tons of wire rods; with England 645 tons of steel bars; with Canada 6,270 tons of scrap, and 3,577 tons of skelp.

EXPORTS of iron and steel wood screws rose to 409,637 gross valued at $57,855. Exports of brass wood screws were only 25,465 gross valued at $8,448.

IMPORTS in merchant steel bars, concrete reinforcement bars, and hoops and bands decreased in the month of September. Included in the imports were 2,902 tons of concrete reinforcement bars and 1,888 tons of merchant steel bars from Belgium; 6,196 tons from Germany and 1,151 tons of merchant steel bars from France.

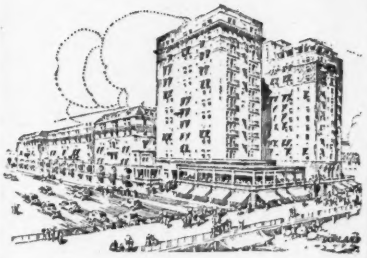
IMPORTS of card clothing again were smaller—the September total being 13,514 square feet, valued at $20,014. The United Kingdom supplied 10,625 square feet ($15,202), Germany 1,799 square feet $3,168 and Belgium 1,090 square feet $1,644.

IMPORTS of wire cloth and screening rose to 36,054 square feet, 9,020 square feet coming from Sweden, 8,005 square feet from France, 7,985 square feet from Germany, 7,556 square feet from the Netherlands, and 3,488 square feet from Canada.

THE trade in Fourdrinier and other paper-making wires was also greater — totaling 79,618 square feet and including 30,706 square feet imported from France, 19,121 square feet from Austria, 18,673 square feet from Germany, 9,396 square feet from Sweden, 1,456 from Canada.

IMPORTS of wire fencing and netting were smaller in September—that galvanized before weaving dropping to 1,369,096 square feet (all of which came from Germany), and that galvanized after weaving to 2,981,525 square feet—1,419,875 square feet from Germany, 1,118,250 square feet from Belgium, and 443,400 square feet from the Netherlands.

The
St. Charles
On the Boardwalk
At New Jersey Avenue
ATLANTIC CITY



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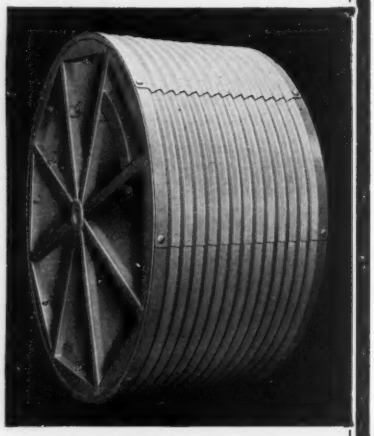
IDEAL CONVENTION FACILITIES

ATTRACTIVE CONVENTION RATES

"Red Head"
Steel
reels



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Sil-Fos
Brazing Alloy
a New Development
PATENTED

For joining copper, brass, bronze, monel, nickel or other non-ferrous metals and alloys.

CONTAINS SILVER, contributing to the strength and ductility of joints brazed with it.

CONTAINS PHOSPHORUS, which has a deoxidizing effect, insuring better results in hands of average workman.

FLOWS FREELY at 1300° F., which is several hundred degrees below the melting point of ordinary "welding rods."

Send for Bulletin 512 WW.

HANDY & HARMAN
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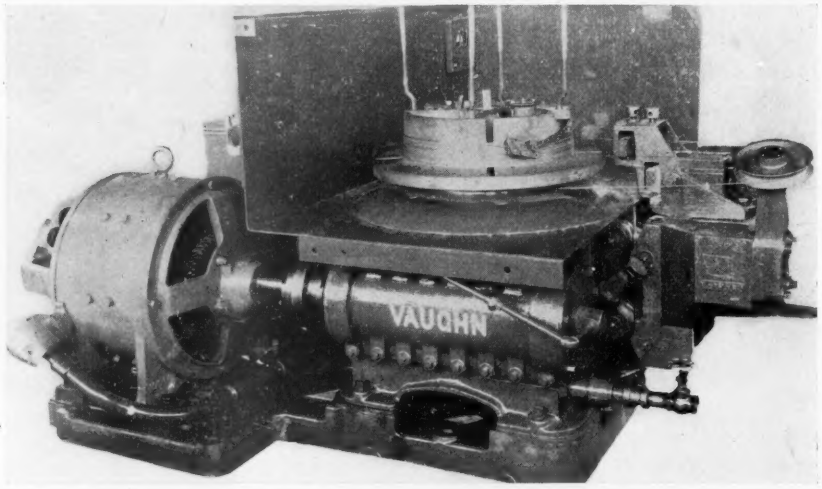
New York

New Wire Machinery

Vaughn Introduces a New Method of Threading Double Draft Wire Drawing Machines

A patent which has been granted to **Edwin J. McIlvried** and assigned to **The Vaughn Machinery Company,** Cuyahoga Falls, Ohio, covering a new method of threading a double draft or "double deck" wire drawing machine should be of great interest to wire mill production men. This is illustrated in the accompanying photograph No. 118-50. The patent covers the raising and lowering die holder attachment as seen quite recently on Vaughn Double Deck Motoblocs.



The usual type of double draft block is provided with a stationary die holder and is threaded by pointing the end of the wire, passing it through lower die, catching the point by means of a pincher on the end of a chain which is temporarily attached to the block, and coiling the wire with the chain around the lower block. After a few turns of wire are made, the operator detaches the wire from the chain and pincher, uncoils a portion of the wire, leaving a sufficient number of turns subsequently to draw the wire through the first or lower die. He then passes the leading end of the wire over a guide pulley through the second or upper die, reattaches the chain and pincher and draws the wire on the top block.

This is a tedious and time consuming operation principally because of the close space between the upper and lower blocks in which the operator has to work. It was felt that if some device could be applied to each block which would enable the operator to thread the machine always from the top block where there is plenty of room considerable time could be saved for the threading operation, and this has proved to be the case by the application of this patent to the machine. The process of threading the double deck machine with this attachment is as follows:

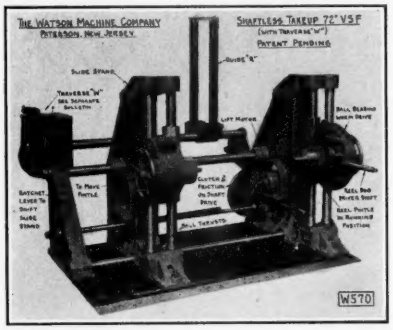
The entire die holder assembly is raised by means of a counterweighted lever, which brings the lower or first die in line with the wire line of the top block. The pointed end of the wire is passed through this first die, gripped with a pincher on a chain and coiled for several wraps around the top block. The wire is detached from the pincher, the coil is loosened and shifted bodily over the flange of the top block to the bottom block. The die holder assembly is then lowered to its normal

position, the leading end of the wire passed over a guide pulley, through the second or upper die and gripped by the chain and pincher and drawn into a finished coil. It is felt that this attachment is a new and distinct improvement for double draft blocks.

✦ ✦ ✦

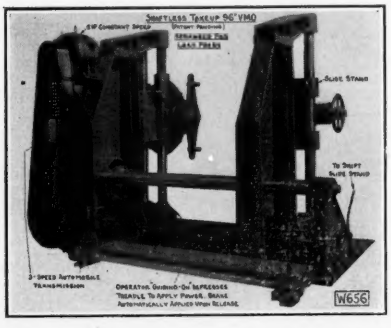
Watson Machine Company Shaftless Take-Up

A patent recently issued to **Charles F. Van Hook** and assigned to the **Watson Machine Company** of Paterson, N. J., covering a shaftless takeup is described below.



Type 72" VSF (With Traverse W). ✦ ✦

The most important single point of this type is the elimination of the reel shaft. The rapidity and ease with which reel entrance and removal are accomplished is also



Type 96 VMO. ✦ ✦ ✦ ✦ ✦

outstanding. Two sizes are built, 72 inches for loads up to 6 tons, (picking up 36 inch or larger reels from base) and 96 inches for loads up to 10 tons (picking up 48 inch or larger reels from base.)

These loads impose stresses which are conservatively calculated and for occasional instances may be exceeded.

The drive stand is preferably arranged for shaft from capstan, as this eliminates unsightly belts and chains and adjustment thereof.

The multiple disc slip-friction is adjustable in operation and this with the slack takeup handwheel combined with positive clutch, centers drive control at the stand in a convenient position.

Lift motor supplied with stand to suit customer's current.

✦ ✦ ✦

Westinghouse Driven Tandem Strip Mills

THREE 300 horsepower adjustable speed motors with control apparatus were recently ordered from the Westinghouse Electric and Manufacturing Company by the Republic Steel Corporation, the order involving approximately $30,000. These motors will furnis hthe drive for rolling cold strip stock of stainless steel in the tandem strip mill of the Republic's Massillon works.

LEADERS

of the Wire and Wire Products industry like the Victoria.

•

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•

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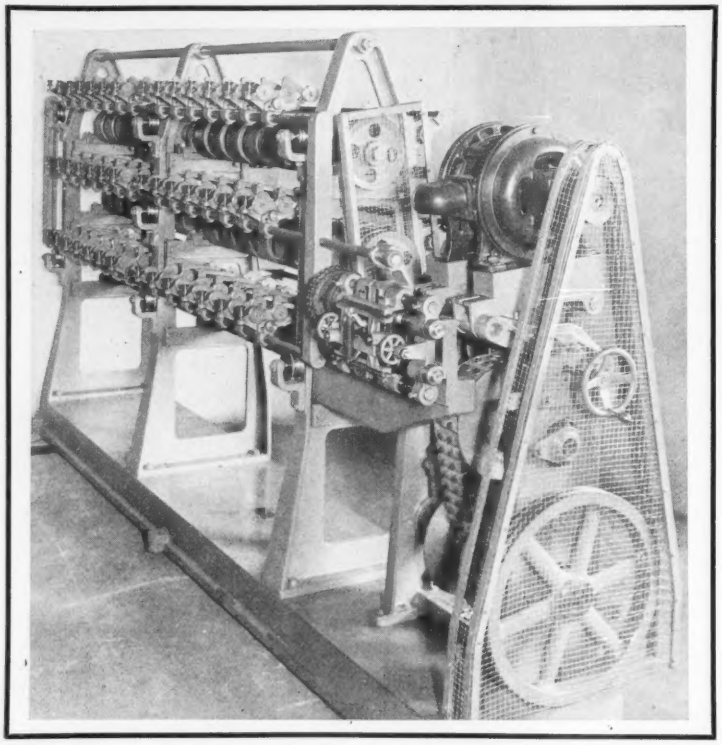
Harry B. Kurzrok, Resident Manager William B. Cravis, Mgr. Director

New Apparatus for Extruding Seamless Brass and Copper Tubes

A PATENT on an apparatus for extruding seamless brass and copper tubes has been granted to Nyle R. Munson of Waterbury, Conn., a millright at the Chase Metal Works.

The description of the proposed apparatus follows: "In an apparatus for continuously casting a metal tube, a vessel containing a supply of molten metal, a casing connected with said vessel, a mandrel within said casing, a water jacket on the outer section of said casing to cause the metal to congeal in the outer end, thereof, whereby a solid tube may be continuously drawn from said casing, said vessel and casing being enclosed by a furnace for maintaining the temperature of said metal above the melting point, and a sliding door in said casing adapted to cut off said water jacket and the outer section of said casing from the hot gases of said furnace."

Rod, Wire, Cable, Strip and Tube Machinery



42 Wire Spooler
For Use With Multi-Strand Bright Annealing Furnace

WE BUILD

Chain Draw Benches—Multiple Coil Winders.
Flat Wire Rolling Mills—Rod Pointers.
Hollow Wire Straighteners and Equipment.
Multiple Strand Bright Annealing Units.
Stranders to Customers' Specifications.
Reelers and Spoolers for all sizes of Wire and Cable.
Reelers and Spoolers for Tinning, Galvanizing, Patenting and Annealing.

Frederick M. Conran

Designer and Builder of Special Machinery

107 Colden St., Newark, N. J.

A History of the Wire Industry

(*Continued from page 469*)

cloth and then by a thick coating of wet fireclay. This composition was then heated to a high temperature so that the pot metal became pasty while the wrought iron plate still held its shape. The plate was then very carefully and lightly hammered, reheated, hammered again and this heating and hammering repeated until the high carbon material had bonded with the wrought iron. The plate was then pricked for a very large number of holes, sometimes as many as 300, all of different sizes, so that a man could draw the entire range of his work in the same plate.

✦ ✦ ✦

DRAFTING was, as indicated above, extremely light. It had to be light since the raw material was rotten and so were the dies, while coating and lubrication were of the most rudimentary character. A reduction of .010 of an inch in coarse wire was considered very daring in 1828. One hundred years later we take off .060 to .070.

✦ ✦ ✦

Summary

TO sum up a historical sketch of the wire industry, is a very tricky piece of work. News travelled very slowly in the early days, especially news of industrial practice. The early wire workers were practically in slavery to the local barons and dukes who naturally got a good revenue from taxing their product and who often forbade the skilled operators to leave their district. Practices varied immensely from country to country and from district to district. Old practices existed for centuries side by side with new practices. Still it is necessary to put together some sort of moving picture of the wire industry.

WE may picture it from say 1000 to 1400 A. D. working from the crudest sort of iron smelted direct from the ore in small charcoal fires and recovered in crude lumps mixed with slag and dirt.

For some centuries it was conceded that wire drawing made greater demands on quality than any other iron working process and the wire mills got the cream of the production. This iron was hammered into bars ½" round, 6 or 8 or 10 feet long, and drawn to wire as described. A contemporary practice was the forging of larger lumps of iron into flat bars, ⅜ to ½ inch thick and 4 or 5 inches wide, from which strips were split off by hand with chisels, and reheated and rounded up with hammer and anvil.

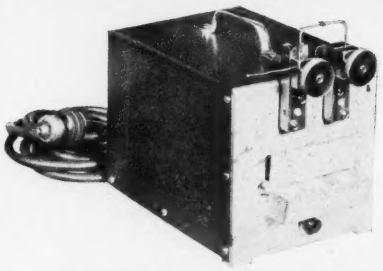
BETWEEN 1500 and 1600, high speed hammers became available. These were trip hammers driven from cams on water wheel shafts and they could forge strips 1" by ¼" and 10 feet long which could be split into rods ¼" square. Two pounds was a good unit weight in those days. Rolling mills crept very quietly into the wire industry and fought it out with hammers for 200 years. The first rolling mills were of course driven from water wheels and were used as slitting mills with collared rolls to divide the forged flats into square rods. There was much argument at the time regarding the quality of wire made from various types of rod. The conservatives claimed that splitting a bar took all the life out of it. As late as 100 years ago, the best authorities maintained that while slit or rolled rods were useable for certain purposes, the only safe and reliable raw material for wire was a hammered bar.

✦ ✦ ✦

The Final Installment of Mr. Lewis' "History" Will Be Published in the January Issue.

✦ ✦ ✦

The Winsted Insulated Wire Company, Inc., has been organized with capital of $60,000 by C. J. Royle and T. G. Bond, Ossining, N. Y. A plant will be operated at or near Winsted, Conn., for the manufacture of insulated wire products, enameled wire, etc.



Electrical Wire Brazing and Stripping Machines

Model M-131 Portable Brazer

Photograph at right shows girl operator stripping—a slight pressure on foot pedal and a twist of the wrist and the wire is cleanly stripped.

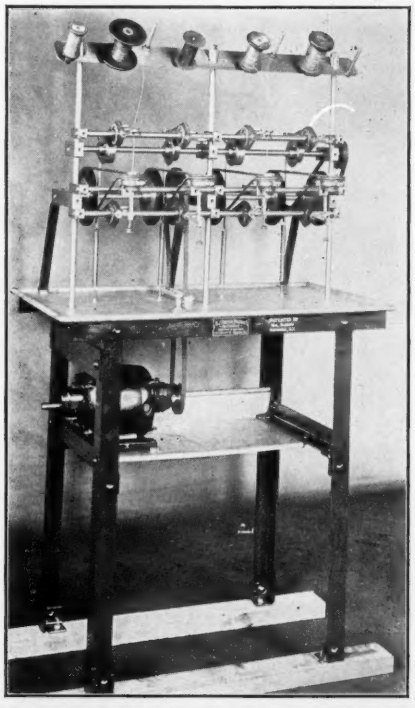
SEND FOR CIRCULAR W-30

Manufactured under Western Electric Patents by

Midwestern Tool Co.

Manufacturers of Special Machinery and Tools, Cutters, Dies, etc.
2811 North Ashland Avenue
CHICAGO, ILL.—U. S. A.

The Haddow Die Re-Cutting and Polishing Machine will lower your die re-cutting cost to a fraction of present costs



Why do you continue to pay a die cutter and pay for diamond dust to remove a large percentage of your diamond from your dies? Diamond that has done no work—when, by the use of the Haddow Die Recutting Machine you may use practically all your diamonds to draw wire, especially in the small sizes.

ONE MONTH'S SHOP PRODUCTION

Total number of dies cut —1047

Total number of hours required—182.5

Average number of dies per hour—5.73

Number of operators—1

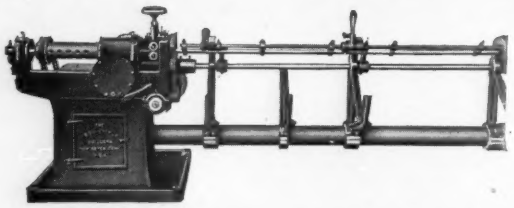
With only one man—This machine will do the work now requiring four to six men in less time and at lower cost.

4 HEAD MACHINE—Also Made in 6-Head size (With 2 Heads for Heavier Dies).

WILLIAM HADDOW
17 Eastern Ave.
Ossining, N. Y.

Straighten and Cut Your Wire on

SHUSTER AUTOMATIC WIRE STRAIGHTENING & CUTTING MACHINES



for profits. They are easy to adjust and operate—up to date in every way. Geared for HIGH SPEED.

Steel Fliers, Timken Roller Bearings and other patented features.

Catalogue No. 30?

The F. B. Shuster Company, New Haven, Conn.

Straightener Specialists Since 1866

BELL MINE

AMERICAN LIME & STONE COMPANY
Bell Mine Products
WARNER COMPANY - MANAGEMENT

THIS lime is especially adapted to the needs of the Wire Drawing Industry. It is free from grit and impurities and is exceptionally adhesive. It is shipped in barrels, bags or bulk. Write for quotations.

Rotary Kiln Pulverized LIME

SALES OFFICES
Bellefonte
New York City
Philadelphia
Pittsburgh

Main Office and Plant at Bellefonte, Pa.

AMERICAN LIME & STONE CO.

(*Continued from page 476*)

or scoring lines on the periphery of the wire.

If the wire had been drawn perfectly, this so-called bond would have been absent. Mr. Whitehead points out that the "bond" on the electro-galvanised sample is deeper than on the others. This merely indicates either that Mr. Whitehead's wire was more imperfectly drawn or that the particular sample was polished more obliquely than the others. Of course, the apparent depth of the surface marks on the base wire will vary with the degree of obliquity of the polishing. It would be a pity if we had to rely on imperfect wire-drawing for the adherance of a galvanised coat.

Mr. Whitehead says that he is informed that it is not possible to obtain satisfactory photographs of coated wires at greater magnifications than 100 diameters owing to the difference of level between the coat and the base spoiling the focus. Mr. Whitehead's experts may not find this possible, but that is no proof that it is impossible. We here are making as many as 30 or 40 routine micro-examinations per week, many of which are photographed. It is therefore probable that while Mr. Whitehead's experts are making one such examination we are making several hundreds, and we do not find it surprising that they should now be encountering the same difficulties which we overcame years ago.

It is quite possible to obtain satisfactory photographs at a magnification of 450 diameters, and at 1,000 diameters a photograph quite good enough to illustrate the points observed in a preliminary visual examination can be obtained. Mr. Whitehead is wrong in assuming that I draw conclusions from the examination of a photo-micrograph. All my conclusions are drawn from a very minute visual examination of the specimen at different magnifications. I then decide what portion of the specimen shall be photographed and at what magnification in order that

the resulting photo-micrograph will best illustrate the features observed.

Mr. Whitehead criticises the low magnification photographs published in my first article. The only feature these photographs were intended to show were the general concentricity of the coat and absence of "drip." They did show these points adequately and there were no sidelight effects. Low magnifications are necessary and sufficient for this purpose, so that the whole periphery of the wire may be included on one photograph. The illustrations were not intended to "hang" either the Crapo wire or the electro-galvanised wire. They merely showed that, in the particular samples examined, so far as concentricity of coat was concerned, there was little or nothing to choose between the two qualities, and I never implied anything else.

In connection with these photographs, however, Mr. Whitehead refers to the dramatic suddenness with which his wire fails under the dipping test. We also observed that, and under the stripping test, the failure of his wire was so dramatic that the last shell of zinc flaked off and continued to dissolve in the bottom of the beaker. This effect appears to be due to the inclusion of non-metallic substance between the coat and the base.

In the photo-micrographs which I published in my last article I drew attention to the laminated character of the electro-galvanised coat. Mr. Whitehead now says this laminated characteristic is an essential feature of his process, but if so, why has he not emphasised it in all the photo-micrographs which he has published of his wire both in his articles and his advertising matter.

Is it possible that Mr. Whitehead's experts have never been able to discover these laminae? If they had, I am sure they would have drawn attention to their extreme importance. On the other hand, is it possible that Mr. Whitehead is making a virtue of necessity? The laminations are there and he must obviously make the best of them. The analogy he

HUDSON WIRE CO.

Successors Royle & Akin

Fine Wire Manufacturers

OSSINING Established 1902 NEW YORK

Manufacturers of Fine Bare Wires

Copper Wire Specially Processed for Enameling Purposes

Copper	Lead
High Brass	Zinc
Low Brass	Commercial Bronze
Pure Tin	Phosphor Bronze
Cadmium	Silver Plated Copper
Bronze, Various Grades	False Gold

10%, 18%, 30% Nickel Silver

LAHN

False Gold Copper Silver Plated Copper

BRUSH WIRES CRIMP and STRAIGHT

Brass Copper

Steel Nickel Silver

Phosphor Bronze

Metallic Fibre for Packing Purposes

BRAND

"B"

Wire Drawing Soap Powder

Made from high titre Palm Oil stock for high carbon drawing.
Proven by test to lower costs and improve efficiency.

Manufactured exclusively for wire drawing by

THE J. T. ROBERTSON CO., INC.

SYRACUSE, N. Y.

Wire drawing soap specialists since 1893.

STEELSKIN

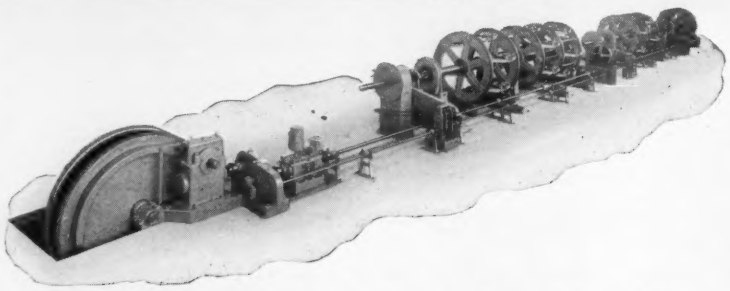
REG. U. S. PAT. OFFICE

For High or Low Carbon Wire

WIRE DRAWING SOAPS

Established 25 years.

R. H. MILLER CO., Inc. Homer, N. Y.



18 Bobbin Planetary Stranding Machine

Complete with taping heads, capstan and receive reel stand.

Bobbins 21″ dia. x 10″ traverse, to hold 500 lbs. of wire.

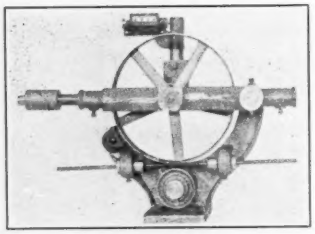
Ball bearing throughout, enabling high speed, with low power consumption.

Capstan 60″ diameter, operated by worm gear and hydraulic variable speed unit to secure varying lays.

Taping heads driven by variable speed transformers.

All operated by a single motor.

The Torrington Mfg. Co.
Torrington - Conn. U.S.A.
44 Franklin St.



IMPROVED
Wire Measuring Machine

For measuring bare and insulated wire.
The new patented double grip model gives you more correct measurements.
You save the difference.
Eight different types will measure the finest wire up to and including 3-inch cable.
All equipped with "VISIBLE" counters.

Manufactured by
HOPE NARROW FABRIC CO.
68 Althea St., Providence, R. I.
Builders of Improved Braiding Equipment for more than 25 Years.

RUESCH

SPECIAL MACHINERY
DESIGNED AND BUILT FOR
WIRE, TUBE AND BRASS MILLS

H. J. RUESCH MACHINE CO.
409 MULBERRY ST. NEWARK, N. J.

gives of the three thin coats of paint being more effective than one thick one is fantastic. Paint hardens by the oxidation of the contained vegetable oils through its surface. Such oxidation must proceed uniformly, or owing to differential shrinkage as irregular oxidation takes place, cracking and peeling will inevitably result. Perhaps in Mr. Whitehead's coat the zinc takes the place of the vegetable oil in the paint. Hence the presence of zinc oxide in his coat need cause him no surprise or uneasiness!

Mr. Whitehead seems to take strong exception to the photo-micrographs which I publish showing the non-metallic inclusion between the coat and the base and between the laminations of the coat. He suggests that the inclusions were not really there because the specimen was out of focus, and puts forward the argument that it is quite impossible to take photographs at a greater magnification than 100 diameters. I am quite sure that anyone having knowledge of the art of microscopy would be convinced from my original photographs that the inclusions were there. If any portion of the photograph was out of focus the whole of it certainly was not, and the inclusions to which I referred could be seen in all parts of the coat, and under visual examination appeared as grey pockets.

✦ ✦ ✦

The next article in the Galvanizing Controversy will appear in the February issue of Wire and Wire Products.

✦ ✦ ✦

Old Die Company Expands

The Diamond Die Co. of America now located at 421 7th Ave., New York, N. Y. will move to larger quarters at 254 West 31st St. about Dec. 1st. The improvement in business, combined with the demand for Ramet Tantalum carbide alloy dies for which they have recently been appointed licensees, necessitates this expansion.

This company, one of the oldest manufacturers of its line, welcomes all inquiries regarding dies for drawing wire, rods and tubing, and their technical representatives will cooperate with all interested parties.

Copper Wire Production On Continuous Machines

(*Continued from page 472*)

dicate these on a similar chart, also the "process" wire, Items K. Add these together giving Items L and divide each Item L by the corresponding production Item H, which will give the hours required on one machine. For an existing equipment operating at different speeds—Item D, and different weights—Items E and F, also Items G, H and I will change. Items H are, in reality, the vital figures, and having determined these either by actual experience or calculation, proceed as above.

✦ ✦ ✦

THE continuous wire drawing machines listed embrace the new line developed by the **Waterbury Farrel Foundry & Machine Co.**, and in general the production results will be found to check up quite consistently with first class average operation.

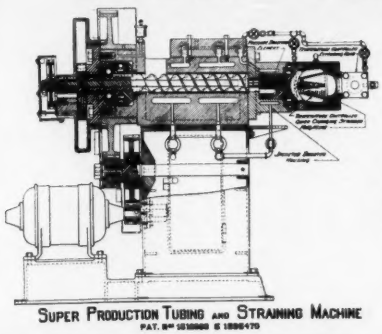
✦ ✦ ✦

A New Publication

"VIM Short-Center Drives" is the name of a new 148-Page belt treatise compiled by the Engineering Research Staff of **E. F. Houghton & Company**, Philadelphia, Pa. It is an entirely new treatment of efficient short center drives. The book contains charts, tables, and engineering data on 5,000 standard VIM EFFICIENCY DRIVES ranging from 5 to 100 h. p. The book is built entirely around VIM special mineral tanned leather belting which is well known among most belt users as being the world's most efficient belt.

This book was originally published for use by Houghton's technical field men, to assist them in discussing and working out transmission problems with engineers, and, therefore, it is not for general distribution, due to the high cost of preparing the data and calculations, as well as printing. Copies will be delivered by a Houghton distributor to executives and engineers directly interested in transmission who will send in their requests in writing on the letterhead of the concern or individual.

Of Vital Interest to Insulated Wire Industry



SUPER PRODUCTION TUBING AND STRAINING MACHINE

A positive and thoroughly proven advance in extruding efficiency that no user of tubing and straining machines, regardless of size, can afford to overlook.

Tremendous reductions in insulating costs by more than doubling speed of production, and additional reductions by combining straining with the tubing operation.

For Detailed Information Address

Corone Wire Insulators, Inc.

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ROCKWELL

FURNACES

ELECTRIC *and* FUEL

For Ferrous and Non-Ferrous Wire Products

Complete heating equipment for strand annealing, billet heating and intermediate operations.

Bright annealing furnaces for ferrous and non-ferrous metals.

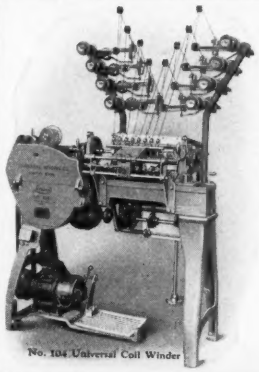
"Furnace and Fuel to Suit Conditions"

ELECTRICITY—GAS—OIL—COAL

W. S. ROCKWELL COMPANY

Industrial Heating Equipment

1885-1 50 Church Street (Hudson Terminal Building) New York



No. 104 Universal Coil Winder

An interesting development for more efficiently producing paper-insulated coils. Paper is injected automatically without attention from the operator. Fully adjustable for a wide range of coil and wire sizes.

Six other machine types complete a line of coil winders answering any possible manufacturing need.

Catalog is available on request.

UNIVERSAL WINDING COMPANY

BOSTON

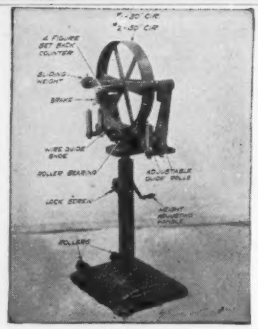
LEESONA

WIRE DRAWING

Machinery and Equipment

Rod Frames—16" Frames
8" Frames—Take-Up Frames
Wire Pointers—Puller Tongs
General Castings for Wire Mill Use
Circulars on Request.

E. J. SCUDDER FOUNDRY & MACHINE CO.
TRENTON N. J.



Our Wire Machinery
Catalogue Sent on Request.

New England Butt Wire Measuring Machinery

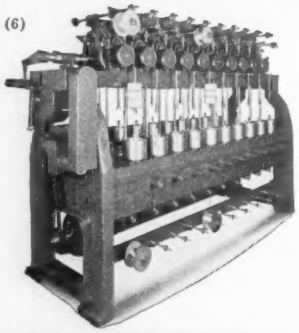
Our style A, No. 2 Measuring Machine is shown at the left. The counter is of the 4-figure set back type, capable of recording 10,000 feet of wire with one setting. Equipped with wire guide shoe, brakes on the measuring wheel and sliding weight to vary the pressure on the wire. Adjustable in height and can be furnished with or without the standard.

NEW ENGLAND BUTT COMPANY
Office and Factory
304 Pearl St., Providence, R. I.
Western Office
20 North Wacker Drive, Chicago, Ill.

WIRE BUNCHING MACHINES
WIRE STRANDING MACHINES
TWINNING MACHINES Up to And Including SEVEN CONDUCTORS
(Manufactured under the Dawes Patents)

HASKELL-DAWES MACHINE CO., INC.
Ontario St. Below Trenton Ave.,
Philadelphia, Pa.

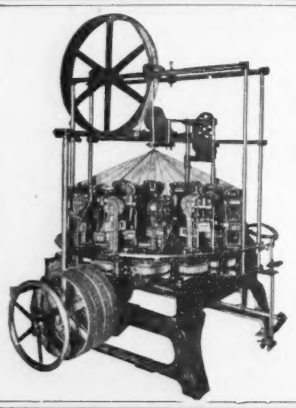
(6)



Model 1S-20 BB Single Cover, Cotton or Silk Insulation Machine.

High-Speed Ball-Bearing Spindles, Flyers are dynamically balanced, operating at 6000 R. P. M.

EST. 1855 AIMCo INC. 1918
"American" INSULATING MACHINERY COMPANY
REG. U.S. PAT. OFF.
517 Huntingdon St.
Philadelphia, Pa., U. S. A.



WIRE BRAIDERS

Multiple Head Wire Covering Braiders

Single, Double or Triple Deck Wire Covering Braiders

Single, Double or Triple Deck Cable Braiders

FIDELITY MACHINE COMPANY
Philadelphia, Pa.

Wedge Nut Lock Manufacturing Methods

(*Continued from page 477*)

The rise and fall of fingers No. 3 and 5 is imparted by slots in vertical guide bars at each side of the finger. Driving gears and mechanism beneath the table of the machine are immersed in oil, and are driven by a belt off a ¾ hp Century electric motor. Cams transmit the power to the finger slides and also to valves beneath the table controlling the air in the five air hoses. The finished nut locks fall through an opening at the center of the table and through a gravity chute into a container.

Heat Treatment

THEY are next heat treated to draw the carbon and correct hardness, by inserting them, in a wire basket, into a Hoskins electric furnace, for a period of approximately seven minutes. The heat is maintained at 1400 to 1600° F. They are taken out and quenched in Houghton special heat treating oil. When drained dry they are transferred to an electrically heated vat of Houghton oil for drawing the temper and rust proofing the metal. The nut locks are left in this vat, holding 5 gallons, for 8 to 10 minutes. The temperature of the oil in the vat

Drying in Starch Extractor—the Final Process.

controlled by two Brown control panels, with pyrometers of the same make.

✦ ✦ ✦

FROM the tempering vat the nut locks are placed in a Bock centrifugal starch extractor which dries them, ready for packing. The locks are easy to apply, the tension holding them tightly to the bolt, and by pressure on the ears they are as easily unscrewed. Additional machines are under construction to meet the growing demand for the product.

✦ ✦ ✦

TWO very interesting bulletins have just been issued by the **W. S. Rockwell Company** of New York City. Number 320 illustrating furnaces for ferrous and non-ferrous metals and Number 318 illustrating the roller hearth furnace for the heat treatment of ferrous and non-ferrous metals, tubes, bars, rods, sheets and coils.

Interesting technical information on physical factors affecting production of uniformly heat-treated products is given in this bulletin.

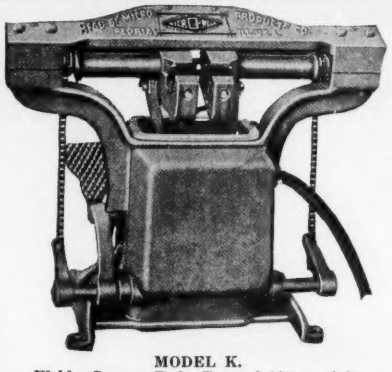
The principles outlined are applicable to all products subject to heat-treatment in the metallurgical, ceramic, chemical and other industries, regardless of the type of furnace or form of fuel or electricity used for heating. The roller hearth furnace is referred to as one method of effecting control of such factors under conditions of continuous production.

Copies of these bulletins may be obtained by addressing the **W. S. Rockwell Company.**

✦ ✦ ✦

THREE books of interest to metallurgists have recently been published. John Wiley & Sons, Inc., 440 Fourth Ave., New York, have announced "High Speed Steel" by Dr. Marcus A. Grossmann and Edgar C. Bain and "Chemical Analysis of Iron and Steel" by G. E. F. Lundell, James I. Hoffman and H. A. Bright, all chemists of the U. S. Bureau of Standards. The price of the latter book is $7.00.

A recent publication, "Metallographers' Handbook of Etching," compiled by Torkel Berglund, lecturer in metallography, Royal Technical College, Stockholm, Sweden, and translated by William H. Dearden, is obtainable from Isaac Pitman & Sons, 2 West 45th St., New York City.



MODEL K.
Welds Copper Rods From 3-16" to 3-8".

For Welding Copper

Other Models With Capacities From No. 20 wire to 5/8" Rods
—For All Metals—

Write for full details of our various models, and tell us something of your needs.

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PEORIA, ILL., U. S. A.

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DIE RECUTTING

ACCURATE WORK — FINE FINISH

75 cents per thousandth—.007 and larger
NO DIE RECUT FOR LESS

Special prices on large lots or on dies less than .007.

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17 Eastern Ave. — Ossining, N. Y.

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1870 — 1931
The Quality Diamond Dies

Balloffet Diamond Wire Dies Co., Inc.
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PLANTS AT
New York — Lagnieu (France) — Cluses (France)
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DIAMOND DIES

When purchasing
Diamond Dies
avail yourself of the
forty years' experience
of the famous

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Any inquiries will be dealt with promptly

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PHILIPS LAMP WORKS

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"The House of Service"

Bellet Diamond Die Works

Manufacturers of

DIAMOND DIES

and

COMPOSITION DIES

Factories { Trevoux—France / New York, N. Y.

New York Office 315 Fifth Ave.

DETROIT WIRE DIE COMPANY

DIAMOND AND TUNGSTEN CARBIDE
DIES FOR WIRE DRAWING

We manufacture our complete diamond dies in this country from the very finest diamonds that are obtainable. We have made a study of wire drawing problems and manufacture the dies to fit your problems.

WE WOULD APPRECIATE AN OPPORTUNITY
TO SERVE YOU

Detroit Wire Die Company 6106 Linwood Avenue, Detroit, Mich.

Cleaning Process Uses Thin Lead Film

A lead film solves the difficult problem of cleaning scale and oxides from metal surfaces thoroughly without pitting, etching or hydrogen embrittlement in the Bullard-Dunn Process, recently discovered by the Bullard Company of Bridgeport, Conn., according to **Lead** the bulletin of the Lead Industries Association. The process is simple and inexpensive. After parts to be cleaned have been freed of grease and oil they are made cathodes in a sulphate-chloride bath. Lead plates are used for anodes. Solution temperature is maintained at 150 to 170 deg. F. Electrolysis of the water causes formation of hydrogen between the metal surface and scale, but a small amount of lead in the solution is deposited as a microscopically thin film on the metal itself as soon as it is exposed. This prevents any attack on the metal and any absorption of hydrogen which would cause embrittlement. As lead will not deposit on lead in this electrolyte at current den-

VIANNEY DIAMOND DIES

100 FIFTH AVE · NEW YORK

The Waterbury Wire Die Co.

Diamond, Composition
and
CHILLED IRON DIES
Waterbury, Conn.

sities used, prolonged immersion does not increase the thickness of the lead film. There is only a deposit of lead sponge or powder easily removed by rinsing. High hydrogen over-voltage of the lead film causes automatic shifting of the current densities from cleaned surfaces as they appear so that remote parts and recesses are as thoroughly cleaned as the more exposed areas. If parts are to be welded or electroplated with other metals, the lead deposit can be thoroughly and quickly removed by treating anodically in an alkaline bath at 200 deg. F.

Current densities of 60 to 75 amperes per square foot are sufficient and a standard 6-volt direct current generator is used. No close control of the temperature, the chemical strength of the solution or the current density is required.

The use of this process in regular production has shown the following results. Physical dimensions are unchanged regardless of the length of treatment. The number of grinding wheels required is materially lessened as a result of thorough cleaning prior to final grinding. The life of polishing wheels has been increased as much as 300% and also due to complete removal of scale the "salt spray life" of electrodeposited coatings has been increased from 25 hours maximum to a minimum of 400 hours. Life of products has been increased as a result of complete cleaning in a process which does not attack the metal surface.

✦ ✦ ✦

Stainless Steel Annealing Process

A NEW process for annealing stainless steel has been developed by the **Alloy Metal Wire Company, Inc.**, Moore, Pa. This process is said to anneal stainless steel wire, rod and strip without affecting its lustre, so that a minimum of buffing will bring it to a high polish. The company states that the saving thus effected in polishing costs is considerable, and a number of users of stainless steel have adopted the process in order to lower their production costs.

Diamant-Drawing Stones

Almost New

made of the best material, 80-250 microns.

Ex stock, at $2.50 each, postage and packing extra; if set, $0.25 more.

N. V. Philips' Gloeilampenfabrieken

Raw Material Dept.

EINDHOVEN, (HOLLAND)

The results you get in drawing wire depend upon the

Experience

of your die maker—we learned that before we made "Premier" Diamond Dies.

DRIVER-HARRIS COMPANY
HARRISON, N. J.

Patents—Trade Marks

All cases submitted given personal attention by members of the firm. Information and booklet free.

Lancaster, Allwine & Rommel

PATENT LAW OFFICES

Suite 438, 815-15th St., N.W. **Washington, D. C.**

BUYERS' GUIDE

For more complete information, consult the annual Directory, Index & Buyers' Guide.

ANNEALING FURNACES
See Furnaces—Various Headings

ANNEALING POTS
Scudder, E. J., Fdry & Machine Co., Trenton, N. J.

ARMORING EQUIPMENT
Amer. Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
John Robertson Co., Brooklyn, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

BAKERS
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

BOBBINS
Mossberg Pressed Steel Co., Attleboro, Mass.

BRAIDER CARRIERS
Mossberg Pressed Steel Co., Attleboro, Mass.

CASTINGS—Wire Mill
E. J. Scudder Foundry & Machine Co., Trenton, N. J.

CLEANING & PICKLING EQUIPMENT
Vaughn Machinery Co., Cuyahoga Falls, O.

COILERS—Sheet and Wire
H. J. Ruesch Machine Co., Newark, N. J.

COMPOUNDS—Insulating
Corone Wire Insulators, Inc., Putnam, Conn.

COMPOUNDS—Wire Drawing
Oak Chemical Co. Bechtelsville, Pa.

COPHOLDERS
Mossberg Pressed Steel Corp., Attleboro, Mass.

CRANES—Wire Mill
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

DIES—Chilled Iron
Waterbury Wire Die Co., Waterbury, Ct.

DIES—Composition
Bellet Diamond Die Works, N. Y.
Urdika Wire Die Works, Inc., New York
Vianney Wire Die Works, New York, N. Y.

DIES—Diamond
Balloffet Diamond Wire Dies Co., Inc., N. Y. C.
Bellet Diamond Die Works, N. Y.
Cochaud Wire Die Co., New York.
Detroit Wire Die Co., Detroit, Mich.
Driver-Harris Co., Harrison, N. J.
Master Wire Die Corp., New York, N. Y.
Union Wire Die Corp., New York, N. Y.
Vianney Wire Die Works, New York.
Waterbury Wire Die Co., Waterbury, Ct.

DIES—Lead Extrusion
John Robertson Co., Brooklyn, N. Y.

DIES—Repairs & Re-Cutting
Balloffet Diamond Wire Dies Co., Inc., N. Y. C.
Bellet Diamond Die Works, N. Y.
Cochaud Wire Die Corp., New York.
Detroit Wire Die Co., Detroit, Mich.
Driver-Harris Co., Harrison, N. J.
William Haddow, Ossining, N. Y.
Vianney Wire Die Wks., N. Y.

DIES—Recutting and Repolishing Machine
Wm. Haddow, Ossining, N. Y.
Vianney Wire Die Works, New York, N. Y.

DIES—Rod and Tube Drawing
Carboloy Co., Inc., Newark, N. J.
Master Wire Die Corp., N. Y.
Union Wire Die Corp., N. Y.
Vianney Wire Die Works, New York, N. Y.

DIES—Tantalum Carbide
Vianney Wire Die Works, New York, N. Y.

DIES—Tungsten Carbide
Bellet Diamond Die Works, N. Y.
Carboloy Co., Inc., Newark, N. J.
Driver-Harris Co., Harrison, N. J.
Master Wire Die Corp., New York, N. Y.
Union Wire Die Corp., New York, N. Y.
Vianney Wire Die Works, New York, N. Y.

DRAW BENCHES—
H. J. Ruesch Machine Co., Newark, N. J.
Scudder, E. J., Fdry & Machine Co., Trenton, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry & Machine Co., Waterbury, Conn.

FURNACES—Annealing
Chas. F. Kenworthy, Inc., Waterbury, Conn.
W. S. Rockwell Co., New York, N. Y.

FURNACES—Automatic
Chas. F. Kenworthy, Inc., Waterbury, Conn.
W. S. Rockwell Co., New York, N. Y.

FURNACES—Bright Annealing
Chas. F. Kenworthy, Inc., Waterbury, Conn.
W. S. Rockwell Co., New York, N. Y.

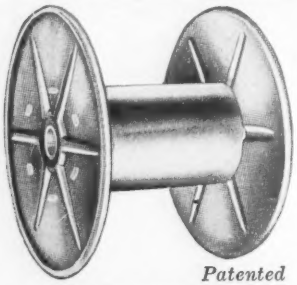
FURNACES—Electric
Chas. F. Kenworthy, Inc., Waterbury, Conn.
W. S. Rockwell Co., New York, N. Y.

FURNACES—Lead Melting
John Robertson Co., Brooklyn, N. Y.

FURNACES—Non-Oxidizing
Chas. F. Kenworthy, Inc., Waterbury, Conn.
W. S. Rockwell Co., New York, N. Y.

FURNACES—Wire
Chas. F. Kenworthy, Inc., Waterbury, Conn.
W. S. Rockwell Co., New York, N. Y.

GALVANIZING ENGINEER
W. H. Spowers, Jr., New York, N. Y.



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Reels and Spools
Made of Pressed Steel

A complete line of reels and spools for every phase of manufacturing, handling and shipping. They are practically indestructible. Send for catalog of stock designs or for quotation on your own specifications.

Above: a curled flange, pressed steel spool for handling and shipping. Pressed-in radial ribs give added strength. Barrels are provided with our patented rib filler.

MOSSBERG
Pressed Steel Corp.
Attleboro, Mass., U. S. A.
Makers of "Mosspeed" Braider Carriers.

New Aluminum Alloy

The aluminum alloy known as "Aldrey" is being used for electrical purposes, especially for transmission lines in place of copper or steel and aluminum cables.

This alloy, contains no copper or zinc. Its analysis is 0.25 to 0.3 per cent iron, 0.4 to 0.7 per cent silicon, 0.3 to 0.5 per cent magnesium and the rest aluminum.

It can be bent, drawn to the finest gages, pressed or welded. The tensile strength is 31 kg. per sq. mm., about 44,000 lb. per sq. in., specific weight 2.7, melting point 650 deg., electrical conductivity the same as copper. It is said to be less subject to fatigue than other metals used in electric transmission and its resistance to corrosion is extremely great.

✦ ✦ ✦

Sales Promotion Manager, trained and experienced in mechanical and metallurgical research and practice, for seven years director of advertising, market analysis and sales contacts, seeks posit on in stimulating sale of sound metal products or production equipment. Address Box 10, Wire & Wire Products, 551-5th Ave., New York, N. Y.

Wire Drawing Compounds

✦ ✦ ✦

Wire Drawing Soaps for Low or High Carbon Wire

✦ ✦ ✦

OAK SUPER

For copper and non-ferrous wet or dry

Can also be used for bright finished steel wire.

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Now used by many leading mills

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"Specialists in Drawing Problems."

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Write for details.

Oak Chemical Products Company
Bechtelsville, Pa.

BUYERS' GUIDE, Continued

INHIBITORS—
Wm. M. Parkin & Co., Pittsburgh, Pa.

INSULATING COMPOUNDS
Corone Wire Insulators, Inc., Putnam, Conn.

LATHES—Die Reaming
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
The Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

LIME—Pulverized
Amer. Lime & Stone Co., Bellefonte, Pa.

LUBRICANTS—Wire Drawing
R. H. Miller & Co., Homer, N. Y.
Oak Chemical Co., Bechtelsville, Pa.
J. T. Robertson Co., Syracuse, N. Y.

MACHINE—Die Re-cutting and Polishing
Wm. Haddow, Ossining, N. Y.

MACHINERY—Armoring (Cable, Wire Hose)
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Braiding
Fidelity Machine Co., Phila., Pa.
Hope Narrow Fabric Co., Providence, R. I.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt. Co., Providence, R. I.

MACHINERY—Brazing Wire
Midwestern Tool Co., Chicago, Ill.

MACHINERY—Bunching
Amer. Insulating Mach'y Co., Phila., Pa.
Haskell-Dawes Machine Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Bundling
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cable, Electric
Fred'k M. Conran, Newark, N. J.
New England Butt Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Company, Paterson, N. J.

MACHINERY—Chain Making
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Closing
Haskell-Dawes Mach. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Paper Insulated Coils
Universal Winding Co., Providence, R. I.

MACHINERY—Coil Winding
Amer. Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Universal Winding Co., Providence, R. I.

MACHINERY—Coiling
Broden Const. Co., Cleveland, O.
Haskell-Dawes Mach. Co., Phila., Pa.
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Copper Wire Drawing and Rolling
H. J. Ruesch Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrell Fdry & Machine Co., Waterbury, Conn.

MACHINERY—Cutting
American Insulating Mach'y Co., Phila., Pa.
F. B. Shuster Co., New Haven, Conn.
Sleeper & Hartley, Worcester, Mass.

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.

MACHINERY—Extruding
John Robertson Co., Brooklyn, N. Y.
Schloemann Engineering Co., Pittsburgh, Pa.
Watson Machine Co., Paterson, N. J.

MACHINERY—Flat Wire
Fred'k M. Conran, Newark, N. J.
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Forming
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Galvanizing Wire
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Gang Winders
H. J. Ruesch Machine Co., Newark, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Insulating
American Insulating Machinery Co., Phila.
Corone Wire Insulators, Inc., Putnam, Conn.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lead Encasing Presses, etc.
John Robertson Co., Brooklyn, N. Y.

MACHINERY—Lead Stripping
John Robertson Co., Brooklyn, N. Y.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Magnet Wire
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Measuring Wire & Cable
Hope Narrow Fabric Co., Providence, R. I.
New England Butt. Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Panning
American Insulating Machinery Co., Phila.

MACHINERY—Pointing
Fred'k M. Conran, Newark, N. J.
Morgan Construction Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
E. J. Scudder Foundry & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
The Waterbury Farrell Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Rivet
Waterbury-Farrell Fdry & Machine Co.,

MACHINERY—Rod
Fred'k M. Conran, Newark, N. J.
Morgan Const. Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
Schloemann Engineering Co., Pittsburgh, Pa.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrell Fdry & Machine Co., Waterbury, Conn.

MACHINERY—Rubber Strip Covering
American Ins. Mach'y Co., Phila., Pa.
Corone Wire Insulators, Inc., Putnam, Conn.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Rubber Tubing and Straining
Corone Wire Insulators, Inc., Putman, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Screw Wire
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Special
Fred'k M. Conran, Newark, N. J.
H. J. Ruesch Machine Co., Newark, N. J.
E. J. Scudder Foundry and Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spooling
Fred'k M. Conran, Newark, N. J.
American Insulating Machinery Co., Phila.
Hope Narrow Fabric Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Spring Making
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening
H. J. Ruesch Machine Co., Newark, N. J.
F. B. Shuster, New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Straightening Hollow Wire
Fred'k M. Conran, Newark, N. J.

MACHINERY—Stranding
American Insulating Mach'y Co., Phila Pa.
Fred'k M. Conran, Newark, N. J.
Haskell-Dawes Machine Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

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Consulting Engineer
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Specializing in Galvanizing Plants Designed and Installed
Practical Engineering Advice
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Wire Mill and Cold Rolling Equipment
10255 Harvard Ave.
CLEVELAND, OHIO

7000 spools for sale
at
a bargain price for the lot

Dimensions:
2½ inch head
3⅛" between flanges
1 inch barrel—⅝" hole

Metal Textile Corporation
Orange **New Jersey**

BUYERS' GUIDE, Continued

MACHINERY—Strip Steel
Broden Const. Co., Cleveland, O.
Fred'k M. Conran, Newark, N. J.
H. J. Ruesch Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Stripping Electric Wire
Midwestern Tool Co., Chicago, Ill.

MACHINERY—Swaging
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Worcester, Mass.
Waterbury-Farrell Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Taping
Amer. Insulating Mach. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Company, Paterson, N. J.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill
Fred'k M. Conran, Newark, N. J.
H. J. Ruesch Machine Co., Newark, N. J.
Schloemann Engineering Company, Pittsburgh, Pa.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrell Fdry. & Machine Co., Waterbury, Conn.

MACHINERY—Welding Wire
Micro Products Co., Peoria, Ill.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Winding
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Universal Winding Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Drawing
American Insulating Machinery Co., Phila.
Broden Const. Co., Cleveland, Ohio.
Fred'k M. Conran, Newark, N. J.
Morgan Construction Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
E. J. Scudder Foundry & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Manufacturing Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury Farrell Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
Watson Machine Company, Paterson, N. J.

PACKING—Metallic Fibre
Hudson Wire Co., Ossining, N. Y.

POINTERS—Wire
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

POTS—Lead Melting
John Robertson Co., Brooklyn, N. Y.

PRESSES—Lead Encasing
John Robertson Co., Brooklyn, N. Y.

PRESSES—Lead Extrusion
John Robertson Co., Brooklyn, N. Y.
Schloemann Engineering Company, Pittsburgh, Pa.

PULLERS—Wire
E. J. Scudder Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

PUMPS—Hydraulic
John Robertson Co., Brooklyn, N. Y.

REELS AND SPOOLS—All Kinds
R. B. Hayward Co., Chicago, Ill.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

REEL AND TENSION STAND—
Sleeper & Hartley Inc., Worcester, Mass.

REEL CRUTCHES
R. B. Hayward Co., Chicago, Ill.
Watson Machine Co., Paterson, N. J.

ROLLING MILLS
Fred'k M. Conran, Newark, N. J.
Morgan Construction Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrell Foundry & Machine Co., Waterbury, Conn.

SOAPS—Wire Drawing
R. H. Miller Co., Homer, N. Y.
J. T. Robertson Co., Syracuse, N. Y.

SOLDER—Silver
Handy & Harman, N. Y.

SPOOLS—Annealing—Detachable Head Handling—Wire Stitching
Mossberg Pressed Steel Corp., Attleboro, Mass.

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TRUCKS
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

TUBE BENDERS AND FORMERS
H. J. Ruesch Machine Co., Newark, N. J.

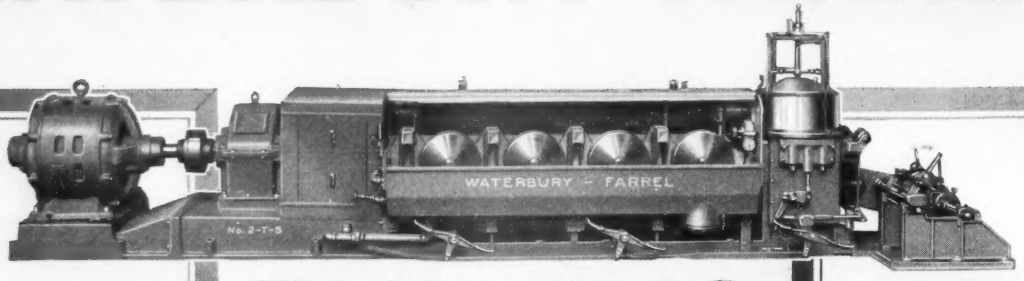
VULCANIZERS
Watson Machine Co., Paterson, N. J.

VULCANIZING PANS
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.

WIRE—Various Kinds
Hudson Wire Co., Ossining, N. Y.

This is a carefully classified index of concerns who specialize in this industry and who advertise regularly in WIRE & WIRE PRODUCTS. Please mention WIRE when writing to these firms.

WATERBURY-FARREL



No. 2 5-die machine, block type with stripper and optional floor spooler. Wire finished in coils or spooled, as preferred. Starting size 3/8 in. copper rod, finishing at No. 5 or No. 6 B. & S. gauge. Flexible - coupled enclosed herringbone drive. Antifriction bearings throughout. Aluminum swing cover for dies.

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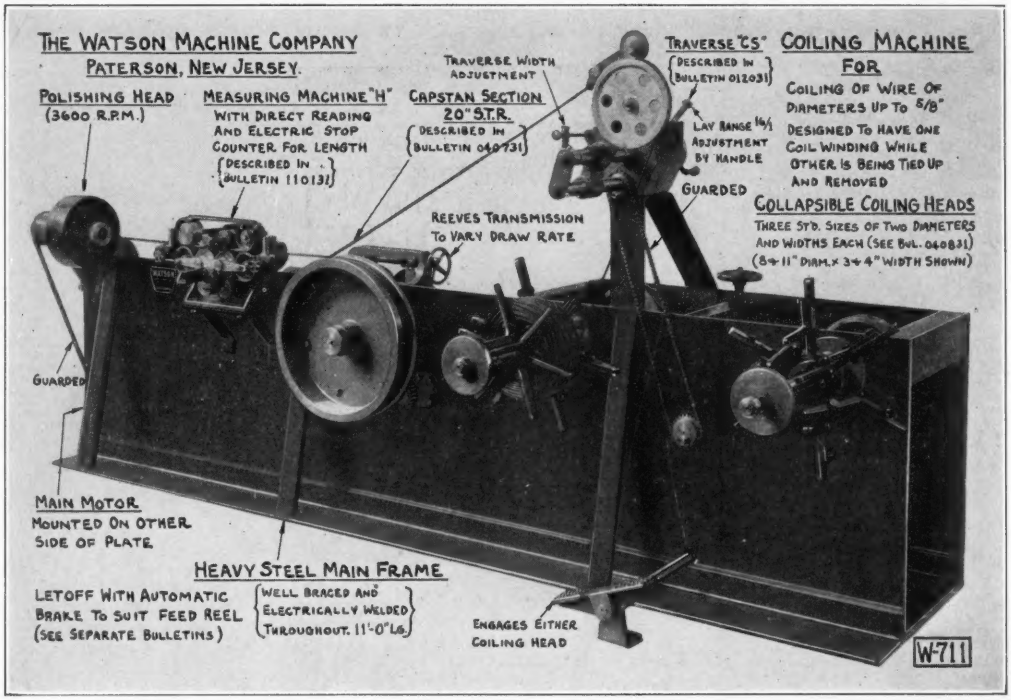
A machine that meets the present day demand for high speed and maximum production efficiency. The No. 2 machine is built in both 5 and 6-die constructions. The No. 1 tandem machine is built in from 5 to 10-die construction. May we send you our complete catalogue of wire drawing machinery?

THE WATSON MACHINE COMPANY

ESTABLISHED 1845

PATERSON, NEW JERSEY, U. S. A.

ENGINEERS - FOUNDERS - MACHINISTS


THE WATSON MACHINE COMPANY
PATERSON, NEW JERSEY.
POLISHING HEAD (3600 R.P.M.)
MEASURING MACHINE "H" WITH DIRECT READING AND ELECTRIC STOP COUNTER FOR LENGTH (DESCRIBED IN BULLETIN 110131)
TRAVERSE WIDTH ADJUSTMENT
CAPSTAN SECTION 20" S.T.R. (DESCRIBED IN BULLETIN 040731)
TRAVERSE "CS" (DESCRIBED IN BULLETIN 012031)
LAY RANGE 1/2 ADJUSTMENT BY HANDLE
GUARDED
COILING MACHINE FOR COILING OF WIRE OF DIAMETERS UP TO 5/8" DESIGNED TO HAVE ONE COIL WINDING WHILE OTHER IS BEING TIED UP AND REMOVED
COLLAPSIBLE COILING HEADS THREE STD. SIZES OF TWO DIAMETERS AND WIDTHS EACH (SEE BUL. 040831) (8 & 11" DIAM. X 3 & 4" WIDTH SHOWN)
REEVES TRANSMISSION TO VARY DRAW RATE
GUARDED
MAIN MOTOR MOUNTED ON OTHER SIDE OF PLATE
HEAVY STEEL MAIN FRAME
LETOFF WITH AUTOMATIC BRAKE TO SUIT FEED REEL (SEE SEPARATE BULLETINS)
WELL BRACED AND ELECTRICALLY WELDED THROUGHOUT. 11'-0" LG.
ENGAGES EITHER COILING HEAD
W-711

COILING MACHINE—Taking insulated wire from feed spool and delivering coils of exact length.

Variable Speed Drive allows operator to adjust speed to synchronize with his ability to tie up and remove coils.

While a coil is being tied and removed, the other is winding; the number of coils delivered in a given time depending directly on the operator's trying-up ability, as the winding operation is automatic.

The Polishing Unit is optional.

Letoff Stands with automatic brake supplied to suit feed reels used.

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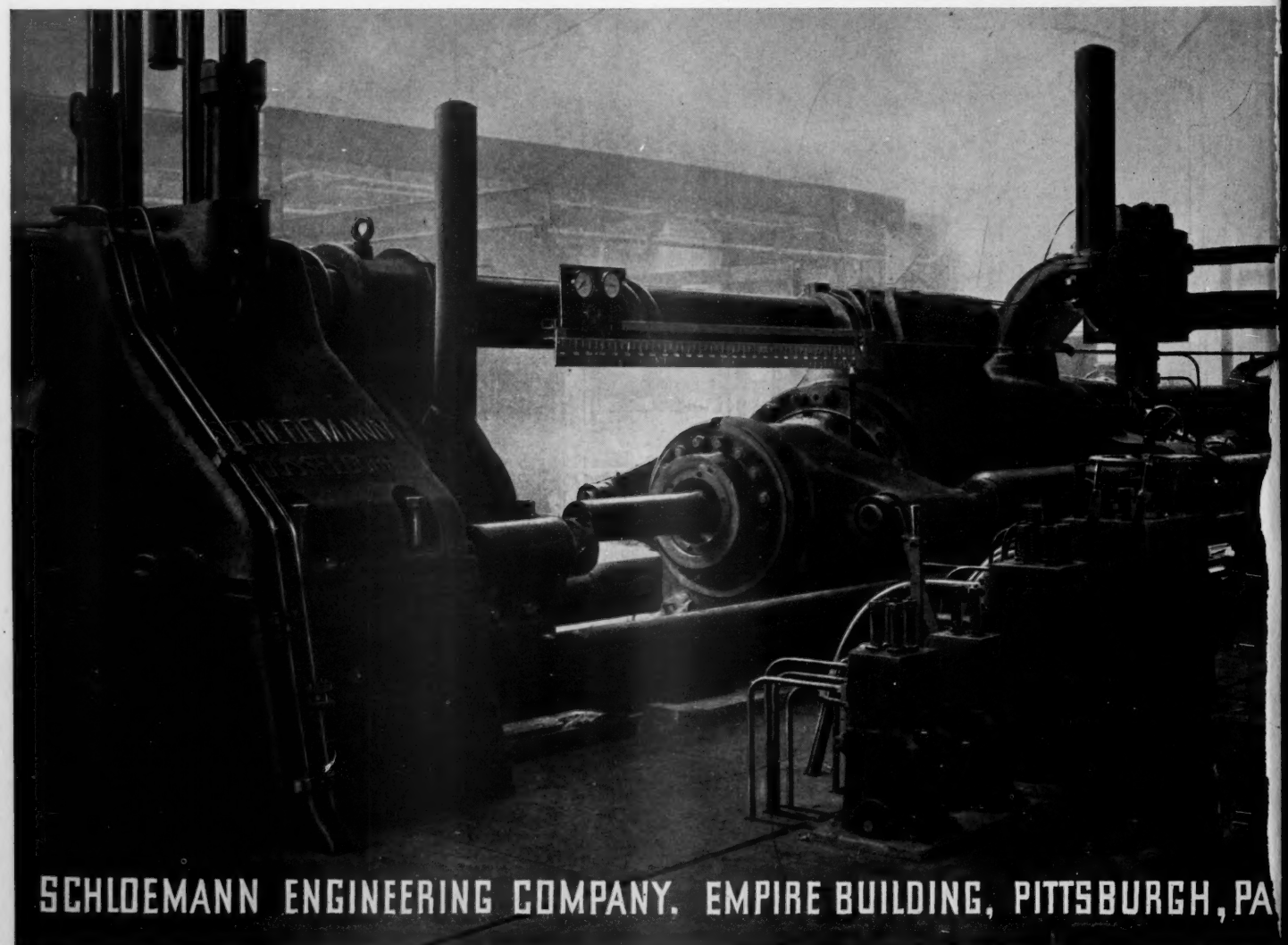
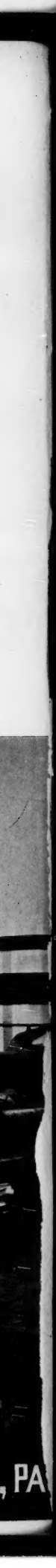
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